

# GUIDELINES FOR DEVELOPING AN EFFECTIVE NATIONAL FOOD CONTROL SYSTEM



Prepared in collaboration with the  
UNITED NATIONS ENVIRONMENT PROGRAMME



FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS  
WORLD HEALTH ORGANIZATION





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## INTRODUCTION

Every nation needs an effective food control service to promote a safe and honestly presented food supply and to protect consumers against foods:

- (1) which are contaminated, decomposed, or adulterated;
- (2) which may be injurious to health, or
- (3) which are deceptively packaged or labelled with false or misleading statements or otherwise fraudulent.

To accomplish these purposes a nation needs laws to encourage the production of safe and wholesome foods and to prohibit the sale of foods which are unsafe or fraudulent. These "General Guidelines" are offered to:

- (1) Explain the need for such food control systems.
- (2) Describe the construction of the legal framework within which such system(s) can operate.
- (3) Provide guidance in setting up effective food control machinery.

These FAO/WHO General Guidelines for National Food Control Services are intended primarily to meet the needs of those responsible for planning, organizing and implementing national food control programmes. The subject has been discussed within a broad policy framework to assist the national authorities in their determination of overall priorities. It is hoped that the Guidelines will also be useful to all those, governmental and non-governmental, industrial and consumer, organizations who have a general interest in the safety and quality of a nation's food supplies; and to all who are concerned with the scientific and orderly development of the food industry and trade.

A nation's planners are confronted with difficult questions, such as: How can an exploding population be fed when, of those already living, over one-half are undernourished? If pesticide chemicals must be used, how can deaths and injuries be prevented? How can the nutrition of the people, including those crowding into urban centres be improved? How can essential foreign exchange be obtained? How can "dumping" of inferior or unfit foods be stopped? What can be done to protect foods from a polluted environment? How can the health and wellbeing of the people be protected and improved?

How should the Government deal with the problems created when natural disasters such as floods or droughts destroy or contaminate great quantities of food, creating scarcities which encourage deliberate adulteration and which may make it necessary to temporarily relax usual food standards to prevent widespread hunger?

All of these problems and others call for careful planning and policies integrated at the national level. One objective of these Guidelines is to explain the part which a food control programme can play in helping to solve these problems and to emphasize why such programmes are needed.

For legislators and others interested in the enactment of food laws a brief history of the development of food control may help to avoid past mistakes. Food laws were necessary two thousand years ago to control gross adulteration and cheating; they are needed even more now to deal with foods, food additives, pesticides, and many new as well as old contaminants to which foods may be exposed by modern processing techniques of environmental agents.

A discussion of general principles and the particular content of modern food law is intended to help any country enacting a new or amending an old law to understand the approaches which are available; the country may then exercise a choice within its own legal and social framework. At the same time, the need for harmony in food laws and standards to facilitate international trade is explained. It is always beneficial to keep the laws and regulations as simple as they can be, compatible with efficiency and national needs.

The nature and content of food regulations are discussed in some detail, and reasons are given why each type of regulation may be needed.

Guidelines are provided for planning and setting up a food control infrastructure, and for the recruitment and training of administrative officers, inspectors and food analysts. The need for adequate laboratories and equipment is explained, along with suggestions for planning food analytical services.

The training of food handlers and the education of consumers are given attention, since these are important to effective enforcement of the food law. Informed consumers, particularly through consumer organizations can help at every stage from consideration of the food law and promulgation of regulations to ensuring support for the agency administering the food law.

The guidance and technical assistance which international agencies may provide to developing countries seeking to establish food control systems or improve those already existing is summarized. Suggestions are made as to how request for guidance and/or technical assistance should be made, and case histories illustrate how aid may be provided. The work of the FAO/WHO Codex Alimentarius Commission is described in Appendix XI. This includes a description of how food standards and codes of hygienic practice are elaborated at the international level, and how information and data about pesticides, food additives, as well as biological and chemical contaminants, are assembled and evaluated.

Just as the survival of the individual depends upon his will to live, the effectiveness of any food control programme depends upon the political will of the nation to see that adequate laws are passed and effectively administered. Even the best laws, regulations and laboratories are not enough to ensure consumer protection and achieve other goals. The laws and regulations must be administered and the laboratories manned by intelligent, well-trained and dedicated individuals. To obtain and hold the services of officials of this calibre they must be given recognition in the form of adequate pay and appropriate prestige. They will work effectively when supported by informed consumer participation. Members of the food industries should realize that their interests will, in the long run, be best served by effective and impartial enforcement of food laws. To produce laws and regulations which are practicable and enforceable, members of all branches of the food industry and trade should participate, along with consumers, scientists and government officials in the development of food laws and regulations. Full discussion at the national level with participation by all sectors of the country is essential.

When consumers have confidence in the quality and safety of their foods, ensured by an effective food control service, trade increases at both the local and international levels. More industries are needed to process foods. International trade brings more foreign exchange. More jobs are created. Farmers have more outlets for their produce. Marketing facilities can be improved. Consumers' diets may become more varied and nutritious. A good food control programme, therefore, can be of benefit to all, particularly by improving the health and wellbeing of consumers.



## CHAPTER I

### THE NEED FOR FOOD LAWS AND CONTROL SERVICES

#### Food control programmes are now more necessary than ever

The rapidly growing problems facing all nations, especially the developing countries, since World War II are forcing planners of national policy to recognize that food laws and control programmes are now more needed than ever before. In fact, they are essential to the success of certain economic and social programmes. Food laws are needed to encourage the production and handling of foods under hygienic conditions to prevent microbiological contamination which now causes most outbreaks of food-borne illnesses, and at the same time to deal with the increasing risks of chemical contamination and attendant health hazards. Nations without an effective food control system can neither ensure supplies of safe and wholesome food, nor can they gain foreign exchange through increased exports of food or protect themselves against losses due to "dumping" of inferior or unfit foods. The population explosion and crowding of people into large urban centres where they can no longer grow their own foods have placed demands on agriculture for increased production. Use of pesticides which is often used to increase production simultaneously presents hazards which must be controlled if the health of people is to be protected and exports to be admitted by other nations. Foods must be transported over longer distances and stored from one season to the next. Protection of food during transport and storage may require the use of pesticides or food additives thus increasing the need for better controls.

The centralized processing and packaging of foods in very large quantities increases the chances of contamination. When a food does become contaminated or spoiled, it may result in outbreaks of food-borne illness affecting hundreds or even thousands of people over great areas. There is an increasing demand for convenience foods, i.e. foods ready to serve or, which can be quickly prepared for serving. Because such foods are especially susceptible to contamination, strict hygienic precautions should be observed. Because food additives are commonly used in these foods, controls may be needed to ensure that such use will be safe.

Industries are desired by developing countries to create new jobs and to provide much needed foreign exchange. Wastes from these industries may contaminate air and water with poisonous substances. Sewage from large population centres pollutes rivers, lakes and estuaries. Without adequate public health controls, foods grown in the polluted areas may be dangerous to health.

Most nations seek to increase trade both within their own borders and with other nations. Expansion of the food trade at either level depends upon demand, which in turn, must be based on the confidence of purchasers which is best maintained when a strong inspection service ensures compliance with standards. Without standards, purchasers have no assurance that foods will be of the expected composition, quality, purity, or nutritive value. Food standards are therefore essential to trade at both the national and international levels. Also, the purchaser must be able to rely upon label representations concerning the food. Without a food law standards cannot be elaborated. Without an effective regulatory agency, purchasers have no assurance that foods will comply with either standards or labeled representations.

Whenever export shipments are rejected by an importing nation because of contamination or failure to comply with legal standards, the losses to the exporter may be very high. In some cases newly developed food industries have suffered heavily from such rejections with consequent damage to the economy of the exporting nation. Needed foreign exchange is lost on the specific shipment, and a developing industry and the institutions which have financed it may be seriously damaged. Rejections by one country may adversely affect trade with others. Common standards are needed to facilitate international trade, even after tariff barriers are removed. Common markets are most successful when the removal of tariffs is accompanied by the adoption of international food standards.

National leaders should recognize the need for food control systems to cope with new hazards to the health and welfare of its citizens growing out of urbanization, industrialization, use of chemicals in agriculture and food processing, and increasing pollution of the environment. At the same time they should realize that unless they promptly begin to initiate food control programmes, they may find their markets more and more restricted because their foods fail to comply with standards of importing countries.

A consultant is preparing a proposal for an improved food laboratory in a developing country made the following comment, which is well worth considering:

"It is impossible to present in exact figures the possible losses to the economy of a country if the proper control of quality of its products is not introduced, and the place of the nations' products in the world market not maintained in the face of fierce competition. The law of supply and demand will continue to operate, but the demand will not be satisfied with an inferior product when a better product is available at a related price."

#### Food control programmes reduce food losses

Though estimates by informed experts vary, there is little doubt that millions of tons of food are lost each year because of inadequate protection against insects, rodents and microbiological contaminants. Losses of food grains and pulses in India have been estimated at 6.6 percent of total production. A loss of 6 percent of the world's cereal harvest would account for 61 million tons, more than 1 1/2 times the harvest recorded in Africa in 1965. It has been estimated that in Malaysia alone rats each year destroy enough rice to feed 10,000 people for that period. Such losses are especially high in some developing countries where the wasted food is most needed to combat hunger and malnutrition. It is just as important to stop these losses as it is to increase production. Methods of handling and storage already being used by advanced segments of the food industry could greatly reduce these losses. Combined with good hygienic practices they could improve both the keeping qualities and safety of certain foods. An effective food control programme combined with training of food handlers can save large quantities of foods which are now being lost.

The effectiveness of pesticide chemicals, food additives and irradiation depends in large part on the conditions of storage and handling especially during and after treatment. Why fumigate or irradiate foods if they are not to be protected against reinfestation or recontamination afterward? Why exterminate rodents if the premises are not protected against immediate re-entry? A well-trained inspectorate can provide guidance and motivation to make the use of pesticides, food additives and irradiation more effective, with less risk.

#### Laws are still needed to control gross adulteration and contamination

Some of the earliest forms of gross food adulteration and contamination are still practised in countries which lack food control laws or effective enforcement agencies. For example, in one country visited in 1969, the average watering of milk was "estimated at more than 10 percent in the rainy season and much more in the dry season." In another country it was estimated that milk was diluted with water "several times over". Developing countries need laboratories to analyse milk samples for added water.

In one developing country a recent survey indicated that 17 out of 21 food samples were either adulterated or below acceptable standards. Salt contained sand. A product with almost no only vegetable fat. Spice samples were found very high in ash, suggesting adulteration with foreign materials. In another country which requires that salt be iodized a survey of different lots of "iodized salt" showed that only one manufacturer was adding the declared iodate.

Making foods appear better than they actually are is also an ancient art which is still practiced. Layers of best quality fruit or vegetables are used to "face" packages consisting largely of inferior or even unfit produce. Colours, flavours and preservatives are used to make stale or decayed meats or other foods appear to be fresh or of good quality. Sometimes harmful dyes or chemicals are used for this purpose. Proper inspection and grading services are needed in both developed and developing countries to check these abuses.

Poisonous contaminants sometimes become mixed with foods during their growing, harvest or storage. Castor beans are likely to become mixed with milo maize grains, or Crotolaria seeds with soybean in some growing areas. In parts of Asia mustard seeds have been deliberately adulterated with argemone seeds that are capable of producing serious illness. Such forms of adulteration can be detected by inspection. Legal authority should be provided to remove the adulterated lots from channels of consumption before poisoning occurs.

#### Microbiological contamination causes most food-borne illnesses

Although increasing use of pesticides and food additives and chemical contamination of the environment are creating potential new health hazards, at present most illnesses associated with the ingestion of foods are caused by microbiological and other biological agents and the toxic substances they produce. It is estimated that in recent years 80 to 90 percent of the outbreaks of food-borne illnesses may be attributed to contamination of food with pathogenic bacteria. It is estimated that in a single country with a population of about 200 million inhabitants there are some two million cases of salmonellosis annually, and Salmonellae are among the mostly widely distributed food-borne pathogens.

Other bacteria which cause many outbreaks of food-borne disease are Staphylococcus aureus, Clostridium perfringens, Bacillus cereus and Shigella. The part played by fungi and parasites as disease-causing agents through food is also known to have great public health significance. Lately Vibrio parahaemolyticus has emerged as a major cause of food-borne disease in areas where large quantities of raw fish or other seafoods are consumed.

It is also recognized that contamination of food with viruses may well be responsible for many food-borne disease incidents which have escaped diagnosis due to the lack of useful laboratory methods.

Among the microbiological agents responsible for food-borne illness, there are some such as Clostridium botulinum and Staphylococcus aureus which develop potent toxins which can cause serious illness or even death.

Proper hygienic practices should be utilized to prevent microbiological contamination, and at the same time minimize spoilage of the perishable foods which are most often the vehicles for these contaminants.

An adequate supply of safe 1/ water is essential for food processing and maintaining sanitary conditions.

Other microbiological food contaminants are discussed in the sections dealing with zoonoses and mycotoxins.

#### Centralized food processing increases importance of controls

So long as foods are processed and sold only within a small area, such as a single village or township, any harmful effects from contaminated food will be limited to the relatively few people in that vicinity. When a manufacturer or processor ships his output on a nation-wide or worldwide basis, thousands can suffer if the food contains an injurious substance. For example, a farmer who prepared a meat speciality for local distribution carelessly added an arsenical pesticide to this. About 100 persons were made ill. In the same country, a large manufacturer of soy sauce used an ingredient which had become contaminated with arsenic while being shipped in a rail tank car previously used for an industrial chemical. The contaminated soy sauce was distributed all over the nation. Many persons were made ill and thousands more would have been poisoned had there not been prompt action by an effective food control organization. In a country with a less effective food control system, some 12 000 children were poisoned when dibasic sodium phosphate contaminated with arsenious oxide was added to powdered whole milk.

1/ World Health Organization (1971) International Standards for Drinking Water, 3rd ed., Geneva.

An effective food control organization is needed to see that large plants making or processing foods comply with hygienic requirements and good manufacturing practices which will prevent contamination. If contamination does occur, it should have the authority and the capability to quickly remove the dangerous foods from channels of commerce.

A developing country wishing to increase its food manufacturing capacity may find itself unable to attract needed capital or gain external markets unless it has a food control service capable of ensuring compliance with hygienic and quality standards in centralized plants. For example, in one developing country a survey was made in cooperation with industry representatives, including some from large food companies, and it was found that the country could produce quantities of canned sardines and of products made from tropical fruits. The interested firms were in position to market them. They were unwilling, however, to proceed with the project until the government could provide adequate inspection service to ensure compliance with hygienic and quality standards, which it could not then do.

Many developing countries are becoming increasingly dependent upon the tourist trade as a source of foreign exchange. Mass catering services are being developed to feed this ever-increasing number of tourists as well as to provide for the mass feeding of school children, refugee and other large groups. If the foods served to these groups are to be safe, good hygienic practices, proper storage facilities and adequate temperature control must be available and be properly maintained.

#### Environmental contamination creates new problems

New industries create jobs and generate capital badly needed by developing nations. At the same time, their wastes may include poisonous substances which can enter foods from contaminated soil, air or water. In addition, large urban centres may be discharging sewage which pollutes lakes, rivers and estuaries, increasing the probability of microbiological and chemical contamination of foods. In fact, waters previously suitable for production of oysters, clams and other shellfish in one industrialized nation are rapidly being diminished due to their gross pollution.

Serious problems for food control officials have arisen when illness or injury followed consumption of foods contaminated with methylmercury, polychlorinated biphenyls (PCB) or cadmium from industrial or mine wastes. However, special agencies are normally responsible for environmental protection.

When there is cause to suspect that large quantities of food may be contaminated with hazardous substances, laboratory facilities are essential to determine which lots are suitable for shipment. Such a problem of immense proportion arose when methylmercury contamination was found in canned tuna fish, and huge stocks awaiting export needed to be examined. Importing countries refused to accept canned tuna bearing residues in excess of specified limits. Some agreed to honor certificates of analysis from laboratories of the exporting country. Without competent laboratory facilities in the exporting country, such arrangements are not feasible. Some developing countries are trying very hard to obtain the laboratories needed to provide such certification services on various foods offered for export. Such efforts should be supported and encouraged.

#### Control of "Dumping"

Developing nations complain that they often receive shipments of foods which are of such low quality that they are not acceptable for use by consumers in the receiving country and could not be distributed legally within the country of origin. This is referred to as "dumping". This term does not apply to foods which though below the quality standards of the country of origin, are considered satisfactory for use in the consuming country. The Stockholm Conference adopted a resolution which included a recommendation that a Code of Ethics be prepared to better regulate international trade in foods which do not comply with international standards or the laws of the exporting or importing nation. Even the elaboration and general acceptance of such a Code of Ethics would not remove the need for importing countries to protect themselves. Some of the larger exporting countries, such as Canada and U.S.A., have provisions in their laws which permit the export of foods which do not comply with their laws only if the exported food does not violate any laws of the country to which it is shipped. If no legal basis for action to prevent shipment, the food control officials in the exporting country have

It is to protect themselves against such shipments that many countries have included in their food laws a requirement that each lot of imported food be accompanied by a certificate to the effect that the food complies with the laws of the exporting country and enjoys "free sale" within that country. Others require registration of each food and the submission of "certificates of free sale". Although such requirements may temporarily restrict "dumping", only an adequate food control service can best serve the long-term interests of the nation.

#### Uniform and accurate weights and measures are essential to marketing

Some 2 500 years ago the prophet Amos denounced those who used a large weight for silver and a small container to measure the grain given in exchange for the silver.

Growers and consumers alike are sometimes still cheated on weights and measures. According to FAO Marketing Guide No. 1, there are many areas in which weights and measures are not standardized, and in case of farm produce "Errors in weighing may reach 50 percent". Some countries which have enacted legislation to standardize weights and measures lack the ability to enforce these laws. Most modern food laws require an accurate declaration of net contents on packaged foods, but where there is no effective enforcement programme widespread cheating may be expected.

#### Pesticides usage increases need for food control

The use of pesticide chemicals has grown rapidly since World War II. The population explosion and the movement of people from rural to metropolitan areas have put tremendous pressures on farmers to grow more food. To meet these needs, farmers are resorting to more and more use of insecticides, fungicides and herbicides. According to the FAO's Indicative World Plan for Agricultural Development, pesticide use in developing countries is increasing at an estimated 11.2 percent per year.

Pesticides are also used to help reduce the tremendous losses of stored foods caused by rodents, insects and other pests. They are used to control flies, roaches and rodents, thus improving hygienic conditions in firms that prepare, pack, store or handle foods. They are widely used by public health and veterinary authorities in programmes to eradicate or control such insect borne diseases as malaria, yellow fever, and trypanosomiasis.

Fortunately, some insecticides, such as pyrethrins and rotenone may be used with limited hazards to applicators or the general public. There are other chemicals whose toxicity is so great that their use must be carefully controlled to protect the health of the general public and of all who prepare, handle, or apply them.

National planners when trying to increase agricultural production through use of pesticide chemicals should be aware that the economic benefits may be balanced off or outweighed by damage to the health of people or losses of export business when residues on exported foods exceed the tolerances established by importing nations. One country reported that it had lowered by an estimated 50 percent the economic losses caused by pests. At the same time there was an alarming increase in the number of deaths and toxic reactions due to the use of these chemicals. Controls were then initiated; earlier action could have prevented many of these poisonings. Some countries have suffered severe economic losses when products bearing excessive residues of pesticides were refused entry by importing countries. Others are threatened with losses in sales of seafoods from waters contaminated by pesticides.

#### Food additives use must be controlled

The rapidly accelerating use of chemical additives such as antioxidants, preservatives, emulsifiers, stabilizers, colours and flavours, creates complex problems. Such use is stimulated by the need to: (1) maintain the physical and nutritional quality of food during shipment, storage, and distribution; and (2) to make foods more attractive, more nutritive, or otherwise more desirable.

Some of these chemicals have been used in foods only recently. There is concern about the safety of many of these additives, particularly about chronic toxicity, mutagenicity, teratogenicity or carcinogenicity. Most countries exercise some control over the use of food additives.

From the standpoint of national planning there should be recognition of the value food additives may have for preservation of the physical and nutritional quality of foods and to make them more attractive. Because of the dangers of uncontrolled use however legal controls are needed. Failure to adequately control use of additives in foods intended for export can lead to rejection of shipments with consequent losses. Recommendations of the Joint FAO/WHO Committee on Food Additives can be helpful in this connexion. To take advantage of this, appropriate legislation is needed.

#### The need to control zoonoses

Zoonoses (those diseases and infections which are naturally transmitted between vertebrate animals and man) have always threatened the health of man and animals. Hazards have increased with the domestication of animals and closer contacts of man with animals and animal products. Developing countries suffer greater losses than the developed countries due in part to their lack of organized public health and veterinary services. Animal diseases and pests constitute one of the most important limitations to animal protein production in Asia, Africa and Latin America. Losses of food due to zoonoses are estimated at hundreds of millions of dollars annually. This is quite apart from the human suffering and death caused by these diseases.

Measures to control zoonoses in order to protect the health of man and animals are badly needed. Effective control involves coordination of efforts by the ministries of health and of agriculture, along with the veterinary health agencies and those concerned with occupational safety. Food control organization and inspection services are necessary for meat inspection and dairy hygiene, and for training food handlers in the hygienic practices essential to protect themselves as well as the public against these diseases.

Many diseases and parasitic infections transmissible from animals to man are recognized as occupational hazards. These are of concern to government agencies responsible for health and for occupational safety. For example, hunters or others handling rabbits may be exposed to Tularemia. Livestock raisers, abattoir workers, and those handling hides or hair from infected animals run the hazards of anthrax. Psittacosis has been transmitted to workers in poultry slaughterhouses. Participation of food control officials may be helpful in epidemiological investigations, and in programmes to improve hygienic measures to protect workers as well as consumers. Likewise, food control authorities may well participate in programmes to teach consumers how to better protect themselves against such things as trichinosis from pork, liver fluke disease and other parasitic infestations transmitted from raw fish, and against many other parasitic diseases commonly found in certain developing areas.

#### The problem of aflatoxins and other mycotoxins

Men have long recognized that the feeding of mouldy grain or hay to animals may cause serious illness or death. Investigations begun in the 1960's have demonstrated that some moulds can produce powerful carcinogens called "aflatoxins", capable of producing fatal liver cancers in poultry, fish, some animals and possibly in man. Nations producing grains, cottonseed meal, groundnuts and certain other foods likely to be attacked by mould have instituted controls over temperature and moisture during storage of the susceptible products. Nations exporting such products suffered great losses due to refusals of importing countries to accept shipments of products bearing aflatoxins. The producing nations have found it necessary to pretest lots offered for export to minimize losses due to rejections.

Developing nations which produce and export groundnuts, Brazil nuts, copra, cottonseed meal, filberts, pistachio nuts or cereals should recognize the need for control over production and storage to retard development of aflatoxin, and the need for laboratories to protect their own population and to pre-test shipments offered for export.

### Atomic energy and food irradiation present new problems

The development and use of atomic energy, which began with the explosion of the first atomic bomb in 1945, have created new health problems including possible harm from foods contaminated with radioactive substances. "Fall out" from early explosions carried radioactive materials over the whole earth. A limited number of foods took up radioactive elements in amounts which made their safety questionable. Fortunately, this hazard seems to be diminishing, so that it is no longer of major concern to food control officials. There remains the possibility that leakage or accidental spillage of radioactive wastes from atomic energy installations may create local problems of environmental contamination with attendant food hazards. Food control officials should be alert to the possible need for emergency measures to deal with this form of contamination. Contingency plans might be made, including the consideration of possible sources of monitoring equipment and trained personnel.

The increasing practice of irradiating foods creates a need for new legislation and food control capabilities to protect against possible health hazards. Some developing countries are considering the possible use of irradiation, as a means of controlling insect infestation in grains, retarding decay or quality deterioration, or destroying disease-producing microorganisms in or on certain fruits and other foods. This calls for very careful consideration of the health hazards involved. Some uses of relatively low levels of irradiation have received safety clearance in several developed nations and by international expert committees, such as the Joint FAO/IAEA/WHO Expert Committee. Uses of higher levels of irradiation may produce chemicals of unknown safety in foods and may cause dangerous mutations of microorganisms. Therefore, extensive testing is essential before the safety of foods subjected to such irradiation can be established. If foods are to be irradiated there should be regulations to ensure that the treated foods will not be harmful to health. The only practical means of controlling food irradiation is through close supervision and monitoring of the actual process. Since many consumers are concerned about the safety of irradiated foods, regulations should include provisions requiring that labels bear a declaration that the food has been subjected to irradiation. Countries should consider the need for controls over imports of irradiated food including labelling requirements.

### The need for food standards

Most nations recognize that the removal of barriers can stimulate international trade, often with benefit to both exporting and importing countries. It is for this reason that nations have associated themselves in groups referred to as Common Markets. Examples of these include the European Economic Community, COMECON and the Latin American Free Trade Association.

Even after tariff barriers are removed, nations find that the free flow of foods between members is impeded by differing food laws and food standards. To achieve the benefits expected from their association in common markets, nations find that they need to harmonize food standards. Harmonization on a regional basis usually increases trade within the area.

(1) Regional standards can prove a barrier to world trade if they conflict with world-wide standards. The international standards elaborated by the Codex Alimentarius Commission are intended to facilitate international trade and improve consumer health and well-being throughout the world.

(2) Among the examples of areas within which standards have been harmonized are the countries of Eastern Europe (COMECON) and Central America. In the latter the value of interregional trade in foods increased about ten-fold between 1960 and 1972 following acceptance of common standards.

### The role of food control in nutritional improvement

Despite the considerable progress achieved in the field of agricultural development, under- and malnutrition continue to prevail among large population groups of the developing world.

It appears that out of 97 developing countries, 81 had a deficit in food energy supplies in 1970. In the Far East, Near East and Africa, 20 to 25 percent of the population is estimated to suffer from significant under-nutrition. Altogether in the developing world (excluding the Asian centrally planned economies for which insufficient information is available) malnutrition affects some 400 million people; a less conservative definition might double the figure 1/.

In the course of past experience an improved understanding has developed of the nature of the nutrition problem, and of ways to deal with it. It has been recognized that malnutrition cannot be solved through food production alone, or through applied nutrition or educational programmes alone. It is understood that national policy, in seeking to raise the socio-economic level of the citizens, must consider all aspects of the food and nutrition problems, i.e. production, marketing, and consumption, and the social and economic factors conditioning them. A national food and nutrition policy could harmonize individual policies taken for each of these sub-sectors. Food control can basically contribute to nutrition improvement through measures in each of these three areas.

Food control services can help increase food production in several ways. As previously noted, pesticides are commonly used to increase agricultural production. At the same time controls are needed to protect the public against the hazards incidental to such use and to make sure that exported foods will not be denied entry because of excessive pesticide residues.

Surveillance and monitoring of contaminants in food can provide useful information on the extent of environmental contamination. Such data may indicate that steps should be taken to control contamination which could cause rivers, lakes or estuaries to be no longer important sources of food. Effective food control, especially that associated with meat inspection and dairy hygiene, can help increase protein production to the extent that it succeeds in reducing the prevalence of zoonoses.

Effective food control plays a fundamental role in the protection of foods against avoidable losses during distribution. By requiring adherence to good hygienic practices during transportation, storage processing and other marketing functions, food control officials can prevent much of the tremendous waste caused by rodents, insects and microbiological spoilage. By controlled use of food additives and surveillance over processing and packaging, they can make sure that nutritive values of food are not destroyed by improper processing, by removal of important constituents or substitution of adulterants having little or no nutritive value or by storage under conditions which cause loss of valuable nutrients. In times when, or areas where, food is scarce protection against intentional debasement through gross adulteration becomes most important.

Food standards and labelling regulations backed by effective enforcement are necessary to enable consumers to make informed choices and buy with confidence. Accurate declarations of net contents, statements of identity and lists of ingredients help the consumer compare values. Statements about nutritional values, if covered by suitable regulations, could help increase consumers' nutritional awareness.

Finally, a food control organization is needed in connexion with any programme to improve nutrition by requiring addition to foods of certain vitamins, minerals, or other nutrients. The required addition of specified nutrients has wiped out certain deficiency diseases once common in some areas of the world. For example, the addition of iodine to salt has controlled endemic goiter in some areas where diets were previously deficient in iodine. Enrichment of flour, bread, corn meal, rice, macaroni and noodles, and other cereal products with B vitamins

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1/ UN World Food Conference - Preliminary Assessment of the Word Food Situation Present and Future - E/CONF.65/PREP/6, page 4.

has greatly lowered the incidence of pellagra in some countries. The deformities of children due to rickets, once common, are now seldom seen where Vitamin D is added to milk (including evaporated, condensed, dried, and dried skim milk), or to margarine, cooking oils or certain other foods. Addition of Vitamin C to specified foods has ended the scourge of scurvy in some areas. However, it has been found that where there is no inspection service, manufacturers tend to discontinue the addition of these nutrients in the required amounts, thus thwarting the purpose of the nutritional improvement programme.

Those who are interested in nutritional improvement should recognize the importance of an integrated approach to this complex problem. Such an approach requires the coordination of the activities of all agencies with responsibilities in the fields of health, agriculture, fisheries, commerce and industry, nutrition, environmental protection, education and consumer affairs. Food control would play an important role, along with other services in this approach.

## CHAPTER II

### HISTORICAL ASPECTS OF THE DEVELOPMENT OF FOOD CONTROL

The practice of food adulteration and the development of control services have exercised the attention of man since the beginning of modern society. A review of past experiences, and an understanding of the lessons learned from history will help to indicate how and why food laws have evolved and how best to deal with emerging situations. A study of this type also indicates the spectacular changes and advances made in the fields of agriculture, food science and technology, especially over the last hundred years or so, which are now helping to provide food for a rapidly expanding world population.

Food laws were among the earliest of enactments known to man. Governments over many centuries have endeavoured to provide for the safety and wholesomeness of man's food by legal provisions and appropriate punitive action when necessary. Over the years also, crude forms of fraud, such as adding worthless substances to food or extracting valuable constituents from it, have been followed by sophisticated methods of adulteration more difficult to detect. The birth of modern chemistry in the early nineteenth century made possible the production of materials possessing properties similar to normal foods which, when fraudulently used, did not readily attract the attention of the unsuspecting purchaser. Later, better analytical methods were used in food control work to detect these adulterants. When scientists demonstrated that some were dangerous to health, an aroused public demanded laws which would both protect their health and prevent fraud.

Although "Food Laws" in one form or another i.e. in the form of religious tenets or prohibitions were inherent in all ancient civilizations and have come down to us from early times, it was not until the late nineteenth and early twentieth centuries - with the urbanization of societies and the depopulation of rural areas - that food laws, as understood today, were prepared. This process was hastened by pressure which developed as the public rebelled against the generally unhygienic conditions of the period.

Since the end of World War II there have been major changes in the food industry and this development continues today; at the same time our knowledge of the risks, actual and potential, has considerably increased. Reorientation and further consolidation of food laws have therefore become necessary to protect the health of the consumer from the many new risks, potential or otherwise, to which he has become exposed and over which he has little personal control. Some of these new dangers include:

(i) Chemical hazards:

- (a) Food additives (direct and indirect)
- (b) Pesticides
- (c) Other chemical contaminants

(ii) Increased hazards from microbiological agents due to:

- (a) Centralized large-scale production of fabricated foods
- (b) Expanded world trade with potential for increased exposure to contamination
- (c) Mass feeding
- (d) Mycotoxin formation

(iii) Radiological hazards:

- (a) From fallout
- (b) Accidental contamination
- (c) Irradiation of foods

In providing a brief review of such a wide historical subject, the division of development into clear-cut compartments of time is not practicable. The periods chosen have no special significance, therefore, other than that of convenience.

## Early History

Food laws can be traced back to times of earliest society. The laws of Moses contain decrees on food similar to certain aspects of modern food laws. Books of the Old Testament (Leviticus 17:24; Deuteronomy 25:13-15 and others) prohibited the consumption of meat from animals which died other than from slaughter and regulated on weights and measures in foods and other commodities. Other ancient food regulations are referred to in Chinese, Hindu, Greek and Roman literature.

In early records classical writers also referred to the control of beer and the inspection of wines in Athens "to ensure purity and soundness of these products". Rome provided for state control over food supplies and, according to records available, protected consumers against bad quality and fraud. This form of food control apparently endured in Rome until the end of the seventh century.

Early food laws were designed to protect purchasers from fraud; this was the predominant legal concern. It was fortunate therefore that health protection happened, in many instances, to be almost synonymous with protection against fraud. Any action taken against offenders, however, was based specifically on fraudulent transaction; there was no stated intention to protect the public health.

Although most traders prefer to deal honestly and fairly, history has shown the need for laws to protect purchasers and honest traders against those who refuse to adhere to accepted codes of good practice. It has been found, as with most other commodities, that when a food was scarce, and demand for it great, fraudulent practices have been most prevalent. Although bread, fish, milk, wines and beer and some other foods were known to have been adulterated, information was available on other foods which were also extended with cheaper or less nutritive substances.

## The Middle Ages

In the Middle Ages some communities formed Trade Guilds, which exerted a powerful influence on the regulation of commerce. These were groups of tradesmen of particular specialties whose purpose was to provide control and general supervision over the honesty and integrity of their members and the quality of their products. Trade Guilds strengthened the position of honest butchers, fishmongers and bakers, and during the thirteenth and fourteenth centuries, regulations were drafted to prevent the adulteration of foodstuffs. Bread was among the items for which detailed manufacturing procedures were stipulated. An example of early Anglo-Saxon law on this subject was the "Assize of Bread" promulgated in England during the reign of King John (1202), under which "bakers producing badly made bread, or giving short measures" were heavily penalized.

In France the most interesting and complete economic document of the Middle Ages available on the subject is the "LIVRE DES METIERS" which in 1268 outlined a code of the comparative practices of the Trade Guilds of Paris. In this work, all practical provisions were made for protection of the consumers' material interests and health, and for ensuring the good reputation of the trade guilds which were similar to those referred to in England of the same period. Reference was made in this work to the facts that: - bakers, innkeepers and brewers, butchers, cooks and retail dealers of fruits and vegetables ... were subject to specific manufacturing and trade regulations. "Everything that may be harmful to the public ... all that may cause deception and falsification ... especially to those ignorant in the matter" must be prevented or suppressed.

These were picturesque details. The flavoring of beer by the addition of pepper seed or resin was forbidden "because these ingredients were considered pernicious to health". The sale of blood pudding was prohibited because "it is a perilous meat". Later, in the statute of the pastry cooks of Bourges (12 May 1274), the use of saffron was forbidden because its colour might create the impression that eggs had been used, or it might disguise deterioration or spoilage in food. The addition to spices from the East of "unauthorized seeds, injurious to the human body" was also prohibited.

In France sworn agents carried out daily inspections in businesses dealing in perishable goods.

The French imposed penalties for violations which included fines, confiscation, expulsion from the Guild, or corporal punishments which, under Louis XI in 1481, were especially harsh: pillorying of a vendor of rotten eggs at whose head the eggs were then thrown; exposure "before a fine large fire" of a seller of butter "containing turnips, stones and other things", with the butter placed upon his head until it melted; condemnation to consume watered wine or watered milk. "Any man who sells watered milk shall have a funnel placed in his throat and the said watered milk poured down until a doctor or a barber declares that the man cannot swallow any more without danger."

For five centuries the corporations in France continued to expand their food control rules, improving the specific points to be observed and tightening their professional discipline, but the Revolution of 1789 in France, swept away the Guild masterships and hierarchies, and freedom of industry and trade was proclaimed.

In many countries at this time the initiative in food control was taken by State, Municipal or other local authorities. In the Netherlands, for example, the Municipality of Amsterdam in 1964 prohibited the addition of annatto or other products to butter to prevent very pale, yellow stable butter being sold as 'May Butter', which was a deeper yellow and in much greater demand. In Germany, apart from the appointment of wine inspectors in 1488 in Schwaben and in Alsace, no organized food inspection system was started until the first Food Act in 1879 was passed.

Throughout all this time both crude and more sophisticated adulteration of foodstuffs was not only practiced but was expected and also taken for granted. For example, in England, the Grocers' Company - an Association for the maintenance of standards and fair dealings - appointed men whose principal duty was to inspect parcels of spices offered for sale and to remove the more obvious impurities which could be readily identified e.g. stones, worthless dust, etc.

#### Industrial Revolution to the Nineteenth Century

The period beginning with the industrial revolution was a time of tremendous expansion in many fields which had a particular bearing on food control services. Changes from rural to an urbanized society, and from a domestic to a factory system, with concentrations of populations, placed a strain on food production and distribution. The period created many public health problems, particularly in the industrialized centres, which were ill prepared to accommodate the numbers which flocked to them. There was much poverty and the uncontrolled development of industrial towns led to appalling conditions much like those which can still be seen in urban areas in some parts of the world. Calls for reform and improvements in matters relating to public health control were frequent and strong and were closely followed by, or coupled with, demands for similar controls over scarce and essential food supplies within the crowded and unhygienic industrial centres. A work appearing in England in 1820 by Friederich Accum entitled "A Treatise on Adulteration of Foods and Culinary Poisons" highlighted the fraudulent practices which endangered the public health. Unfortunately this author's work was rejected by society at that time as had happened to many earlier papers, which had drawn attention to the adulteration of specific foodstuffs.

During the nineteenth century, however, legislation and other means to control the composition of various foods did appear. In 1858 a municipal service was set up in Amsterdam for the control of foodstuffs and beverages. This was followed in England by the enactment of the first comprehensive modern food law in the world. This was an Act of 1860 for "Preventing the Adulteration of Food and Drink". In addition to its being the first such Act, it provided for a scientific approach to food problems by the appointment of an analyst whose sole duty, in terms of the Act, was "to examine the purity of articles of food and drink".

An important change brought about by the industrial revolution was that many people who became town dwellers could no longer produce their own food and began to rely exclusively on food produced and sold by others. The food shortage, and the great demand for it in these urban areas, created fertile ground on which adulteration could, and did, flourish. As the food problems became more involved and specialized, laws enacted for consumer protection required continual up-dating to keep pace with the changing needs. This situation was responsible for the production of many food laws in the industrialized nations during the latter part of the nineteenth century. Simultaneously, the development of laws in relation to food control became complex and piecemeal. Food control provisions were often relegated to the most convenient statute then available. Legal provisions were therefore difficult to follow, not easy to locate and often difficult to apply because of this dispersion, particularly if enforcement responsibility was in the hands of different agencies.

Despite positive progress with the production of Laws following this period, suitable 'back up' services, so essential for effective control, failed to keep pace. Many laws appearing shortly after this time continued to be primarily directed towards the prevention of fraud and 'to ensure value for money', although consumer health also indirectly benefited from this approach.

In 1810 France included the following punishable acts in its Penal Code:

- (a) knowingly selling any commodity, the nature of which is not in accordance with that declared (Article 432);
- (b) selling any drink made harmful by adulteration (Article 318);
- (c) selling adulterated (but not dangerous) drinks (Article 475).

These provisions were later revised by laws of 1851 and 1855. Similar provisions were made in the Penal Code in the Netherlands when in 1881 the following acts were made punishable offences. Whosoever knowingly sells:

- (a) foodstuffs injurious to health and life and conceals this danger; or
- (b) foodstuffs and beverages that are adulterated and conceals this fact.

These provisions were very difficult to apply since it was often impossible to prove that the offences were "knowingly committed". The English Act of 1860 which was voluntary and did not work, was replaced by a new Act in 1875 which was mandatory and placed absolute liability on the food traders covered by the Act. Germany in addition to the Food Act of 1879 also referred to earlier, created Food Inspection Bureaus, the first of which was established in 1884. In many of these laws, provision was made for the appointment of analytical chemists in order "to determine with accuracy, the extent of adulterations" - this was another important advance in the continuing war against adulteration.

During this period, similar types of laws appeared in Canada, Belgium, Germany, Italy, Austria and the Scandinavian countries. Although the main food control activity at this time was in the industrialized nations of Western Europe, many other progressive countries also enacted food laws. Apart from European countries, laws were produced in Australia, Canada, the United States of America and elsewhere. Australia did not enact a national food law; this is a function of each state and remains so even to-day.

The second half of the nineteenth century produced clear recognition of the importance of food control services and nations legislated accordingly. The dangers of food adulteration were accepted and these enactments formed the base for more modern laws in years still ahead.

A major issue of the times was the recognition of the need and value of the food analyst. With a food law and a public analyst two main requirements in any food control service had become available. The third essential for a comprehensive service was still missing - unbiased inspection and sampling procedures. A final point in connection with this period was the reaction of various authorities at international congresses which are referred to in the relevant section later in this chapter.

### The Twentieth Century

The twentieth century has seen remarkable advances in all areas of food technology. These changes have in turn required greater flexibility in legal controls, in order to adequately protect the consumer from newly emerging hazards and to assist the food trade in its development. Too rigid a law can stifle enterprise. Many developed nations, and some emerging nations, have recently either completely reviewed and updated their laws or provided new laws to meet the new situations. Some examples of these are Sweden, the Federal Republic of Germany, Kenya and Zambia - there are others. It should be noted that the main purpose behind the Swedish review was to reorganize the all-important administrative arrangements and, from January 1972, the National Food Administration became the main supervising authority for foodstuffs in Sweden, becoming responsible for some duties previously carried out by other ministries and agencies.

Modern food laws must be more precise in their application, more specific and complete in content, and take account of situations beyond national borders. Protection of the consumer has been extended to control of false descriptions of products, nutritional declarations and misleading claims in labelling and advertising. Trading partners now require a working knowledge of each other's food laws. It is sad to see that some countries, even today, have either unsatisfactory food laws, no food laws at all or laws which for one reason or another they do not, or cannot apply. Where national enactments are available, it is interesting to note that in their development, they have followed reasonably similar courses which, despite individual progression over many years, have emerged with differences, but also with broad similarities and closely related timing.

During the latter nineteenth and early twentieth centuries, there had taken place a general consolidation of earlier rules, but more important, this period saw the creation of a separate branch of law relating to foods.

### The Developing Nations

In contrast to the steady development of food control and general economic prosperity in industrialized countries - particularly since the industrial revolution - the situation in many of the developing nations remained relatively stagnant. Food control was in most areas unknown except possibly in some larger nations and there was little evidence of social or economic development. Firstly, for historical reasons, they did not benefit directly from the industrial revolution. In some ways this could be looked upon as being beneficial to the local consumer since he was not affected by the monetary economy, and the general socio-economic structure remained static. A subsistence economy remained in force, as it had done for many centuries in the past and a measure of consumer protection arose from the fact he would either produce his own food or barter from within the village where he lived and worked. Secondly, there were no food processing plants and no modern techniques of intensive agricultural production or animal husbandry.

Although many nations were not directly affected by the industrial revolution, there were side effects on some. The industrial nations, finding that farm labour had moved to the more profitable urban areas - often resulting in a reduction of essential food supplies at a time of population increase - turned to overseas markets to make good the shortfall. Many non-industrialized nations found ready markets, and increased potential for export in the production of the particular foods for which they were climatically suited. In concentrating on these exports the national food economy was neither sufficiently diversified nor balanced to meet local national needs. The expansion of export crops continued alongside the more primitive barter systems where local people continued to 'work' smallholdings for their immediate needs, or for local barter. At the same time a situation arose where the developed and the non-industrialized societies became dependent on each other in the production and purchase of various foods.

Following examples of the introduction of early food control measures by developed nations, some of the larger or more established non-industrialized societies took steps to set up measures of control themselves. For example, in India, the influence of English thought

could be seen, where, as early as 1860, the adulteration of foodstuffs was prohibited under the Penal Code and later under the provisions of some municipal acts. By 1919 when the portfolio of health was transferred to the Provincial Governments, most of the provincial authorities made special provision in the municipal acts for the prevention of food adulterations. There was, however, little uniformity either in the field of standards or in the mode of enforcement. In order to reconcile the divergent laws of the various provinces and to fix uniform standards of purity of food articles, the Department of Health of the Government of India in 1937 set up a Central Advisory Board of Health. The Board appointed a Committee to go into the question of food adulteration in the country with particular reference to the varying food standards and legislations then in force. This Committee was called the "Food Adulteration Committee".

In pursuance of the recommendations made by this Committee a "Central Committee for Food Standards" was formed in 1941 under the aegis of the Central Ministry of Health. This Committee functioned as an advisory body on the lines of the Society of Public Analysts in the United Kingdom.

After independence of the country in 1947, more serious thought was given to the problem of food adulteration. It was soon realized that provincial food acts were not only outdated for India's purpose, but they also hampered trade and industry. In order to ensure purity of articles of food sold throughout the country, the central government enacted the Prevention of Food Adulteration Act of 1954. This Act, with its later amendments is still in force.

In the Far East, food control was slow to appear and it was not until the 1940s or, even as late as the 1960s when measures were introduced. Japan, with its rapid industrial development was one of the exceptions, although many of her neighbors did not move so quickly. Malaysia's first food laws appeared in 1952. Thailand's current Food Industry Control Act of 1964 replaced earlier acts of 1941 and 1959 and both the Philippines and Indonesia had no food laws, as such, until the 1960s.

On the other side of the Asian sub-continent, Iran had started food inspection in 1940. Powers for this were embodied in the Epidemic Disease Act, and analysis of products was carried out in the laboratory of Teheran Municipality. The current food law of Iran was passed in 1965 and is now supported by laboratories and a General Department of Foods, Beverages, Cosmetics and Sanitary Commodities. In Iraq food laws were available in 1930 with sampling being conducted by officials of the Ministry of Health; there is also a separate standards organization in Iraq.

Food laws in Africa were of little significance until the second half of the twentieth century. Independent states which started to emerge from the late 1950s were influenced in many matters, including food control services, by the European countries with which they had been closely associated. French territories, for example, had developed French food enactments, British territories followed British procedures and so on. Food legislation, where it existed at all, was often inherited in total by the newly independent states, and required major adjustment for situations quite different from those for which the enactments had originally been designed. Local efforts to update and adjust the many variations and discrepancies in previously existing legislation have led eventually to the decision by some countries, that a completely new food law was the only way in which the local situation could be adequately dealt with. The legislation available to most countries at the time of independence was overtaken and swiftly outdated by the tremendous advances made in the food industry in recent years.

The developing countries have many pressing problems, not the least of which is the great lack of skilled or trained personnel. There is not the local staff available to draw up food laws suited to their particular circumstances, or the scientific or technical staff necessary for food analysis, sampling and efficient inspection. There is also a shortage of materials and equipment and many other problems connected with the inauguration and operation of an effective food control system.

Events, for example, in Latin America followed a different course. Although there was almost no development of industries during the nineteenth century, agricultural production and cattle raising increased. Large volumes of meat, bananas and coffee were exported. When the world-wide

depression between 1930 and 1940 diminished the demand for such exports, some of the more advanced countries began industrialization. The period between the two World Wars was also marked by demands for social legislation. Many Latin American countries enacted food laws during that period, though Mexico had some food control provisions as early as 1891. In two of the four nations with a federal system (Argentina, Brazil), food laws, as in Australia, were enacted by state or provincial governments. Because the differences in laws of the states often hampered trade within these nations, Argentina and Brazil enacted national food laws. Although the legal systems of most Latin American nations are based upon those of Spain and Portugal, significant differences have developed in their food laws. Efforts are now being made to harmonize these.

With a few prominent exceptions, such as Argentina and Brazil, the legal provisions concerning food hygiene are generally embodied in Sanitary Codes which deal with most aspects of human and animal health. These are administered by the Ministry of Health. Often, however, authority to elaborate food standards is delegated to a separate agency which is responsible for developing standards for many things other than foods.

Developing nations wishing to provide new food control services may have many advantages on the pioneers and are in a position to capitalize on the efforts - and errors - of others when setting up their own food control services. It is important to ensure, however, that any new law which may be introduced, is correctly adjusted to local situations and that while safeguarding national interests, it is not seriously in conflict with the general requirements of the world's main markets for foods. Such nations could well achieve a more complete and modern food law before others have been able to extend and improve their current legal controls.

Some nations may need help in setting up food control programmes. This help may take the form of:

Legal assistance in:

Drafting legislation  
Promulgating regulations

Financial aid to:

Train staff  
Build and equip laboratories

Technical assistance to:

Conducts initial surveys and planning  
Advise on laboratory procedures  
Provide expertise to develop food standards, regulate food additives, establish tolerances, etc.  
Help with training through fellowships, national or regional training centres, etc.

#### The International Situation

Although international involvement in matters relating to food control is of comparatively recent origin, no historical review of this subject would be complete without reference to the nature and extent of this development.

Realizing the seriousness of the deteriorating situation, several international congresses on public health, hygiene, medicine, pharmacology and chemistry were held, notably in 1879 at Amsterdam, in 1884 at The Hague, in 1885 at Brussels, in 1887 and 1891 at Vienna and in 1903 at Berlin. It was in Vienna in 1887 that the congress on public health appointed the members of an international commission who were also responsible for the "International review on adulteration and analysis of foodstuffs" which was published between 1887-1916. The need for international food laws was relatively unimportant until about the time of the industrial revolution, when, as already noted, large concentrations of people left rural areas to settle in rapidly expanding centres. The urgent need for improved public health and food

control became more apparent. However, efforts made at international level, during the early part of the twentieth century - (when the international food trade was rapidly expanding) - to stimulate international cooperation proved fruitless. The tremendous technological advances following the second World War further stimulated world food trade and demanded that the position be reassessed. Groups of nations once again considered international problems of food additives and pesticide tolerances but these discussions, which provided a valuable springboard for further talks, failed to produce positive international or regional harmonization of food standards. Post War years also produced groups of nations which, in order to facilitate the smooth flow of perishable and other foodstuffs between nations, saw the need for the removal of some national obstacles. Groups of this type were found in Europe, Africa, Latin America, the western hemisphere and elsewhere; they were however principally concerned with marketing conditions.

With the increasing interest in common markets and improved international food trade, Member Governments of the Food and Agriculture Organization and the World Health Organization, following procedures dating from 1958, established in 1962 a Joint FAO/WHO Food Standards Programme and created a joint subsidiary body - the Codex Alimentarius Commission. The Commission has now assumed the leading role in the setting of international food standards throughout the world. Details of the work of the Codex Alimentarius Commission are given in Appendix XI.

The question of the harmonization of interests and food standards is considered in Chapter V and although the difficulties involved may appear to be considerable, there are also areas of common ground. These should be explored. The harmonization of standards need have no effect on traditional foods found in most nations; the ultimate aims are consumer protection and, by the removal of non-tariff barriers, the smooth flow of foods between nations. It is the interests of all nations to take advantage of the work done by the world body and also to give due consideration to the experiences of other nations in producing their own food laws and food control services.

## CHAPTER III

### PLANNING A NATIONAL FOOD CONTROL SERVICE

#### National objectives and how to reach them

The establishment of an effective food control service, like any other successful government project, must be preceded by careful planning. Plans made for one country will not necessarily suit the needs of another, since countries differ in background, socioeconomic conditions, legal philosophies and systems of government. Food control problems vary from country to country as do the human and financial resources available to cope with them.

Nevertheless, most nations have common objectives which should be kept in mind when planning. The objective of any food control service is to promote a safe and honestly presented food supply to protect consumers against being offered foods which are injurious to health, unfit for human consumption, adulterated or presented in a deceptive manner. Other national objectives which an effective food control service can help to achieve are: preventing avoidable losses of foods during harvesting, processing, storage, transportation and handling; improving the nutrition of the populace; encouraging the orderly development of food industries, stimulating increased foreign exchange earnings through the export of foods which comply with acceptable standards; and avoiding the losses that occur when substandard or unfit foods are imported. Food control is often viewed merely as policing activity. The part which a good food control system can play in developing a nation's economy is often overlooked.

For the food control system to contribute to the achievement of these goals, there must be a basic food law, supplemented by detailed regulations and administered by a capable food control organization.

#### Establishing priorities

Each nation must decide how it will expend its limited funds and other available resources. These will be used most effectively when priorities are established upon the basis of needs, with careful consideration being given to the benefits in relation to the cost of each item. In the fierce competition for limited resources to meet many pressing needs, food control services often do not receive the consideration due to them. This will probably continue so long as food control services are thought of solely in terms of restrictive policing instead of being recognized as valuable contributors to national development and the general health and well being of the population. Almost all countries give high priority to the objectives which have been mentioned. When national planners recognize the importance of an effective food control service in helping to reach those objectives, they are likely to give such service a higher priority, particularly if they also appreciate the extent to which the national economy can be impaired when large numbers of people are debilitated by food borne diseases, parasitic infestations, malnutrition, or by other disabilities.

#### The essential elements of a food control service

To be effective a food control service needs a basic food law designed to protect consumers against health hazards and fraudulent practices.

This should be supplemented by regulations to require that sound hygienic practices be followed in the production, preparation, processing, transportation, storage and distribution of foods; to establish food standards; to prescribe safe conditions of use for food additives, pesticides and the irradiation of foods; and to require informative labelling which will not mislead or deceive prospective purchasers.

For effective administration of these laws and regulations an organization of capable administrative officers, inspectors and analysts with adequate laboratories and other facilities is needed.

It has been found that best results can be achieved by education and public participation and also by the stimulation of voluntary compliance.

Although advisory services and voluntary compliance should be emphasized more than they have, there will still be a need for magistrates and courts to deal with persistent law breakers, to ensure appropriate disposition of violative lots of food, and to adjudicate contested actions.

#### Design and size of the food control organization

Before deciding upon the design and size of a food control organization a very thorough survey should be made to assess needs; determine what resources are available to meet these needs and to decide whether reorganization of laws, staff and facilities could lead to the basic structure of an effective food control system; and then to establish appropriate priorities accordingly.

In order to determine the resources required, a government, at the planning stage, should give consideration to:

The population to be served and the rate of expansion.

The total area involved, the density and distribution of population and the administrative divisions i.e. provinces, areas, regions, etc. best suited to effective control. Agricultural production; the number, sizes, and types of food industries which will be controlled; the general conditions prevailing within the national wholesale and retail trade; and information about imports and exports.

Anticipated number and types of food samples to be analysed each year in order to determine:

- (a) the size and capacity of the central and any peripheral laboratories which may be considered necessary;
- (b) staff requirements;
- (c) equipment and chemicals which will be necessary.

Proposed inspector stations and whether the existing staff, with additional training in food control measures will be sufficient, or whether new staff will be required.

The provisions of training facilities for:

- (a) Inspectors; (b) Food scientists; (c) Industry personnel, including distributive services and (d) to establish educational programmes for consumers.

Planning and implementation will be determined largely by finance, the availability of staff of an acceptable standard, and whether or not buildings, equipment, materials, etc., are available and accessible. In planning for either the establishment or expansion of a food control service, a complete assessment of the situation should be made and placed before national planners and those responsible for priority rating or the allocation of funds. This submission should be supported by a reasonably concise and clear assessment of relative benefits to the nation, the hazards against which the service is directed and the economic and other disadvantages likely to result from failure to introduce a food control service. Decision makers and planners should therefore be fully informed. Incorrect judgement at the planning stage may materially retard future operations in either the establishment of new services or the expansion of an existing system.

In considering available resources, account should be taken of the need for continued support. A small organization assured of money and competent personnel to keep it operating can accomplish more than a much larger organization which finds it lacks resources for continued maintenance or efficient operation. In fact, much can be done with limited resources provided the staff members are dedicated, adequately trained, and receive encouragement from the authorities and general trust from the public.

Good planning should include provisions for the future expansion of the organization and its facilities in line with anticipated growth of population, and industrial and technical developments.

## CHAPTER IV

### A MODERN FOOD LAW

An effective food control system must be based on an adequate food law and will derive its powers therefrom. It is generally convenient for nations to deal with food law in two parts i.e. (a) a basic food act and (b) food regulations.

A modern food law should be sufficiently flexible to meet the needs arising from rapid change in the technology of the food trade. Experience has shown that the Act itself requires significantly less variation than regulations. In order to reach an efficient, practical and flexible administration, it has been found expedient for the Act to lay down broad general principles of control leaving regulations sufficiently adaptable to meet the frequent changes which arise. While the Act itself sets out broad principles, regulations will contain detailed provisions governing the different categories of products coming under the jurisdiction of each set of regulations.

Sometimes food standards, hygienic provisions, list of food additives, chemical tolerances, etc. are included in basic food control law, i.e. the Act itself. This procedure should be discouraged because:

- The law becomes voluminous, cumbersome, less flexible and difficult to understand.
- Lengthy laws are less likely to be understood by members of the food industry and consumers.
- It is much harder to have laws amended than it is to revise regulations especially in the technical areas of food standards and food additives, which may frequently vary.

It is desirable to include, in the text of the basic food law, principles or general provisions relating essentially to the following points:

- basic purposes of the law;
- definitions of basic concepts;
- scope of the law;
- competence for implementation of the law;
- inspection and analytical procedures and facilities;
- enforcement, procedures for enforcement, penalties;
- food standards;
- regulation of additives and procedures for the authorization of the use of additives;
- regulation of pesticides and other contaminants and tolerances relating thereto;
- packaging and labelling;
- procedures for the preparation and amendment of the regulations for implementation of the law;
- repeals and amendments to earlier legislation which may be affected by a new or updated act.

In addition, certain provisions, in so far as they are not covered by other general laws, may be provided, e.g. importation, warranty and other related defence matters; obstruction and legal action against inspecting officers, etc.

Further consideration is given to:

- the nature and purposes of food law
- drafting a food law
- definitions of basic concepts
- scope of a food law
- food standards and regulations
- the central advisory or coordinating body
- powers of enforcement officers
- protection of trade secrets and other confidential information
- registration of food premises
- licensing of food establishment
- registration of specific foods
- penalties
- repeals

## Nature and purposes of food law

Food law is the body of law of a country which governs the production, handling and marketing of foods. In view of the rapid technical developments occurring in the food industry and trade, and of the increased need to ensure wholesome food for the consumer and protection against fraud, adulteration and contamination, food laws should be designed to:

### (a) Protect the health of the consumer

The production, processing, storage, transport, handling and sale of foodstuffs may create dangers for consumer health, and the legislator should guard against, or overcome, these dangers.

### (b) Protect the consumer against fraud

Legislation may be enacted and regulations issued to ensure that the consumer receives the product he legitimately expects, taking into account, in particular, the packaging and labelling of the product. His confidence must not be betrayed.

The proper implementing of such a law will encourage fair trade practices through compliance with the basic provisions of the law and with standards and other regulations promulgated under the law. This will protect the honest manufacturer and dealer against unfair competition. It will also stimulate development of the food industry and trade, since quality control along sound scientific lines tends to promote better consumer acceptance of foods.

## Drafting a food law

The first step in an assessment of the situation therefore is to determine whether it is best to update existing laws or to discard old enactments and introduce a completely new law. In a national assessment some countries will find that their legal structure for food control is so far outdated that its application to modern conditions is not possible. Others are likely to have legal provisions for food dispersed among many related and unrelated statutes which are difficult to locate, hard to apply and impossible to enforce.

National administrations may wish therefore to consider the following points to assist in this important decision.

- Is there a food law in existence either as a comprehensive enactment or are legal powers for food control administration dispersed over a series of different laws?
- Is the current law so hopelessly out of date, or so inadequate for modern needs that it no longer fills the role for which it was intended?
- Does the law provide sufficient machinery for review of food control situations and the implementation of improvements?
- What administrative procedures are necessary for any change in the law and what further consultations are required in order to effectively institute these changes?
- Does the current law provide for new regulations, the adoption of international standards, acceptance of codes of hygienic practice, etc. and if not, what provisions should be included in the new law?
- Do current laws and practices make adequate provision for financial support of the enforcement organization or should new sources of revenue be considered?
- Can the present stage of development of the national food industry meet modern requirements and what would be the impact of new legislation on domestic production, imports, exports, etc.
- Can the existing law be adapted to the modern situation or is a completely new law necessary?

- If a modern law is introduced, is the nation in a position to effectively apply it? An unused law of little value, just as it is equally unsatisfactory to fail to introduce new provisions for food control which the nation has the resources and ability to apply.

Whatever the stage of national development, a periodic review of this nature can only be beneficial, but it should be conducted by food law experts conversant with the general legislation in force and in close cooperation with modern food scientists.

Having made an assessment of the situation it may now be worth considering how best to develop a new food law, this will also indicate points necessary for updating older enactments. The approach will once again be governed by the political structure of the country.

Consideration of the following matters may help:

- Any new food law should be framed within provisions permitted by the constitution and also within the nation's background, political organization and historical connections.
- Food laws must conform to types and styles of general legislation.
- The extent to which the law should be enacted at federal or state level.
- The judicial system, court procedures, penalties to be applied and related legal situations.
- The extent to which common services, or laws which have a bearing on food control measures, must be taken into account in enforcement procedures, e.g. sanitary laws, administrative measures, etc.
- The government structure, participation of various ministries, the need for coordination and participation with industry, scientific and academic interests and with consumer organizations.

#### Definitions of basic concepts

##### Relating to the scope of the Act

The basic law should include all necessary information concerning the notion food. By means of definitions or other appropriate criteria, it should make it possible to determine what is a food properly so called, and to distinguish the food from any non-food product or substance which could be taken for a food. It should define or list the materials or articles which, while not themselves foods, are considered as foods through a legal extension of the concept of a food.

The law should also contain sufficient information to make it possible to determine what is meant by food additives.

##### Relating to the nature, hadling or special qualities of foods

The legislation should, where possible, define the notions or special means of referring to foods or food additives in texts relating to them, including the following notions, given as examples only:

- natural, imitation food;
- 'normal', wholesome, clean, hygienic food;
- spoiled, filthy, putrid food;
- food unfit for human consumption;
- dangerous, harmful, noxious food;
- adulterated food;
- irradiated food;
- enriched, fortified food;
- dietetic food;
- food additive;
- pesticide residues;
- contaminants.

### Relating to activities regulated by the law

Activities dealing with food products and regulated by the law should be defined precisely. As examples, it should be specified what is meant by:

- marketing: sale, offer for sale, exchange, giving in place of cash payment, holding for sale, etc.;
- production, treatment, processing, handling, distribution, transport, storage of food products, technical processes, etc.;
- packaging and labelling of products: labels, trade marks, controlled appellations of origin;
- food standards;
- advertising.

### Relating to violations

Where they are not precisely defined in penal legislation, the basic food law should determine the exact content of offences which can give rise to penal action, and in particular;

- the idea of fraud in general;
- the idea of fraud in the food trade, and the various types of deceit (as to the nature, substantial qualities, composition, content of useful or nutritive substances, date or process of manufacture, quantity, etc.);
- deliberate adulteration of food products;
- production or marketing of foods which are spoiled, contaminated, harmful or unfit for human consumption;
- production or marketing of foods containing prohibited or unauthorized substances;
- false advertising;
- fraudulent use of labels or trade marks;
- failure of foods to satisfy standards laid down by law;
- illegal holding of substances or articles capable of being used for fraudulent purposes;
- violation of food control provisions (refusal to submit to legal control measures, failure to obtain required authorizations, etc.);
- violation of hygienic requirements.

### Scope of food law

The scope of food law should be clearly stated in the text of the basic law or in its preamble. It should also indicate the exceptions to the ordinary provisions, if any, made in view of:

- The origin or destination of the product: exceptions made for products imported, in transit or intended for export only.
- Special requirements of ethnic, religious and other communities.
- Special characteristics of certain foods governed by other enactments.

## Food standards and regulations

- These are considered in Chapter V, pages 28-45.

## The Central Advisory and Coordinating body

Statutory provision for such a body has been found very useful in many cases. A more detailed consideration of this can be found in Chapter VI, pages 46-53. By whatever title it may be known, however, it is important that this body is not too large and is representative of the various industries or departments of government concerned with food control matters, food industry, consumers, scientific bodies, etc. It has also been found useful to have powers available to set up committees as may be necessary and for the cooption of members to the central body in particular situations.

## Powers of enforcement officers

These should include such issues as:

- who will be authorized officers? (including their statutory qualifications if not set out elsewhere);
- powers of entry, inspection, examination, sampling, detention, seizure and the disposal of seized or prohibited foods;
- whether payments are to be made for samples and whether samples should be collected to provide portions for the owner or for other purposes;
- the detention of suspected foods, offered for sale, pending analysis.

## The registration or licensing of food establishment

Although registration or licensing of food establishments should not be considered as the sole means of controlling the hygiene of food premises, either can be a valuable aid in applying the food law. Information such as the name and address of the firm, the ownership and identity of responsible persons, the types and volumes of food handled which are usually included in applications can be very helpful to authorities in planning for inspection and sampling, and in the preparation of budgets.

Conditions for registration or licensing vary, but usually licensing provisions include stricter controls and frequent renewals. Either should require inspection before the establishment begins operations, and for suspension or revocation when an establishment is found operating under insanitary conditions which may be hazardous to public health and fails to make correction after warning.

Licences are usually renewed at intervals of about one year. When premises are registered they usually remain on the register until removed for some reason. Frequent renewal of licences places an added burden on administrative authorities. On the other hand, licence fees sometimes provide a significant part of the funds for administration of food law.

Sometimes a mixed system may be used, with licenses required only for firms handling highly perishable foods such as milk, meat or seafoods which may present significant health hazards. Registration may be required for firms whose normal operations are less likely to involve health hazards. Some form of licensing to do business as a food establishment is widely required.

### Registration of specific foods

The laws of some countries, especially in Latin America, require that each packaged food be registered before it may be distributed. Usually this applies to both domestic and imported foods. The application for registration supplies information about the name, address, ownership or corporate status of the firm, specific management responsibilities of officers, etc. Qualitative or quantitative formulae accompanied by specimens or proofs of labels must usually be submitted. Information about colours, flavours, preservatives and other controlled additives may be requested. Certified copies of analysis may be necessary. If reports on the sanitary aspects of the premises are mandatory, certified copies of these must be submitted.

Usually a food is not registered until at least one sample has been analysed and found passable by a laboratory authorized to make such examinations. Sometimes the samples are submitted direct by to the laboratory by the manufacturers or importers. This practice is subject to possible abuse; sometimes it has been found that the sample did not accurately reflect the quality of the food actually being distributed. Sampling by government inspectors from lots offered for distribution is preferable.

Uniform fees are charged for registration. Normally graduated fees are charged for analysis. These fees can provide an important source of revenue for food control services provided they are not paid into the national treasure and diverted to uses other than food control. Furthermore, there should be some provision for charging higher fees whenever analytical costs increase.

Registration may be "for life" or for a specified number of years subject to cancellation if violations are discovered. Registration for a period of three to five years is preferable. When registration is "for life" or for an excessively long period the control authorities do not know which foods are actually being distributed and cannot make definite plans for collection and examination of samples.

A form of provisional registration which permits distribution for a few months before samples are collected and analysed is being tried in some countries. From the standpoint of the government this is preferable, for arrangements can be made for inspectors to collect samples at times when the laboratories are not glutted. Manufacturers and importers like provisional registration because they do not have to withhold distribution for long periods of time awaiting the results of analyses.

As is apparent, the registration of individual foods may require much time and manpower which might be more effectively utilized in other control activities.

### Penalties

With regard to penalties, it should be noted that legislation and regulations generally lay down maximum fines or periods of imprisonment for offences; the actual amount of the fine or the term of imprisonment is often left to the discretion of the Court. The latter, however, may tend to be excessively lenient, and to overcome this it would appear desirable to consider introducing into the food laws a system of minimum penalties (fines or imprisonment) which would result in preventing the Court from imposing penalties lower than those foreseen by the legislator. Such minima could not of course be uniform, but would depend on a scale set up on the basis of the type and seriousness of the offence.

It is important to ensure that court and related proceedings be carried out without unnecessary delays.

Legal Provisions should:

make defense safeguards ensuring:

- That primary responsibility is placed on the producer or packer;
- the passing of responsibility back to the real offender by means of warranty or other provisions;

- the protection of the seller under other conditions;
- the cancellation of any licence which may have been provided, or
- the cancellation of any form of registration in use;
- the application of other administrative sanctions such as:  
denying the right to practice trade;  
adverse publicity.

#### Repeals and Amendments

Repeals and Amendments will refer to those earlier national enactments repealed or varied by the new provisions. In consolidating legislation or providing new acts it is necessary to repeal or amend many earlier provisions no longer required.

Appendix I provides an example of a possible structure of a food law. This model food law has been developed by the FAO/WHO Food Standards Programme to assist developing countries in assessing existing food legislation. The model law has been drafted to be an enabling act which covers all the points discussed in this chapter but places responsibility on the appropriate Minister for preparing and publishing detailed food regulations.

## CHAPTER V

### FOOD STANDARDS AND OTHER REGULATIONS

#### A. THE NATURE AND CONTENT OF FOOD REGULATIONS

##### Regulations Implement the Basic Food Law

The need for and nature of basic food laws have been discussed in the preceding chapters. For effective administration of and enlightened compliance with the basic law detailed provisions are needed. In governments where there is a division between the responsibilities of the legislative and executive branches, the legislative branch enacts the basic law, while detailed regulations are elaborated and promulgated by the executive agency or agencies responsible for administering the law. Usually the authority to promulgate regulations is included in the basic law. Other laws may govern the procedures to be followed in developing regulations.

Inclusion in the law of detailed specifications about food processing, food standards, hygienic practices, packaging and labelling, food additives and pesticides would make the law cumbersome and unwieldy. Prompt revisions of regulations may become necessary because of new scientific knowledge, changes in food processing technology or emergencies requiring quick action to protect the public health. Such revisions can be made much more expeditiously by executive agencies than by legislative bodies.

In some countries food standards are part of the regulations; in other countries they are separate enactments. Regardless of whether they are included in regulations or are separate, they become part of the enforcement structure, and are intended to implement the basic food law.

##### The Content of Food Regulations

Food regulations should cover, to the extent needed in any individual country, the following:

General regulations (including rules for the elaboration of food standards and regulations)  
Food standards  
Food hygiene  
Food additives  
Pesticides  
Food packaging and labelling  
Food advertising

##### Some General Observations

Regulations should be written in clear concise language, easily understood by all concerned with enforcement or compliance. A regulation is promulgated only when there is a recognized need for it, either present or anticipated. When a regulation is developed as the result of a recognized need, it is more likely to be practicable and acceptable to the regulated sector of the industry or trade.

Most regulations are mandatory, though some may be intended only as policy interpretations or guidelines. For example, codes of hygienic practice often serve as guidelines for voluntary compliance; in other cases they may be made mandatory. Mandatory requirements should be clearly identified as such and be enforceable.

All regulations concerning food control and inspection should be gathered in a single publication available to interested persons. In many developed and developing countries it is difficult for the food manufacturer to obtain copies of all regulations concerning the foods he produces. Sometimes even the agencies responsible for food inspection have not assembled all applicable regulations. When responsibility for food control and inspection is divided amongst several ministries or departments the need for a single compilation of all food regulations becomes especially acute.

## B. GENERAL REGULATIONS

### Detailed Regulations Are Needed by Enforcement Officers and All Those Subject to the Law

Detailed general regulations are needed for the guidance of those who enforce the law and of those who must comply with or be affected by it. These regulations will vary greatly from one country to another, in both form and content, for they must be promulgated in accordance with the constitution, the governmental structure, the legal context of the food law of the country involved, the state of development of the food industry and trade and certain socio-economic conditions.

### Regulations Concerning Official Actions

Detailed regulations are needed for such things as:

Delegation of authority for making inspections, collecting samples, making decisions about seizures and the disposition of seized lots of food.

Designation of laboratories for analysing samples.

Payment or non-payment for samples. Regulations sometimes provide for payment only if the food is found non-violative.

Indicating the number of subsamples to be taken and whether to provide the owner with a portion of the sample.

Provisions for appellate analysis when the results obtained by the government laboratory differ from these by the owners analyst and are contested.

### Regulations concerning Advisory Committees

If the law makes provision for advisory or coordinating committees regulations are needed to specify how members are to be chosen, how long they will serve, and if the committee includes those who are not government employees how these are to be reimbursed for expenses, etc. The duties and responsibilities of the Committee must be definitely set forth. Also the regulations should indicate the extent to which officials are to be bound or guided by Committee recommendations.

### Regulations to Guide Industry Including Transportation and Trade

Regulations needed for guiding the regulated industries will depend upon provisions of the law concerning warranties, licences, registration of firms or of individual foods, "certificates of free sale", or certification that foods being exported comply with the laws of the country to which they are being shipped.

Regulations concerning warranties may include the exact format, who must sign, and when they should be presented to serve as a defence.

Regulations concerning licences (permits) may include the application form to be used and what information it should provide, fees to be paid, provisions for any required inspection before granting the licence, how long the licence is valid, when renewal must be applied for, causes for suspension or revocation and conditions for reinstatement.

If firms must be registered, the regulations should specify the form to be used, the information to be provided, how often registration will be required, and any fees for registration.

If registration of specific foods is required, the regulations should supplement the requirements of the law to the extent needed. See Chapter IV for a detailed discussion about the registration of foods.

If "certificates of free sale" are required, regulations should specify the forms to be used, the information to be provided, what agencies in the exporting nation are acceptable as signers of the certificate, and whether or how often the certificate must be renewed.

Some countries require that foods offered for export be accompanied by a certificate that the food complies with the law of the importing country. Regulations may specify the form to be used, the information to be included (such as identifying marks) and who should sign the certificate.

#### Regulations concerning Sampling of Imported Foods

Regulations concerning imported foods should cover all aspects of the handling of imported foods, including such things as notification by importer and by customs officials, collection and submission of samples for analysis, release or detention of the shipment, conditions under which detained foods may be brought into compliance, payment of costs for reconditioning operations including supervisory costs, and the final disposition of detained lots.

#### Public Information

Food control services operate best when general public is kept informed about their activities and policies. All available media, including radio, T.V. and newspapers should be utilized. Both consumers and the regulated industries should be advised of and given the opportunity to comment on proposed food standards or major changes in policy. There should be regulations to provide for dissemination of information about agency activities, and to govern disclosure of official records. If public hearings are to be held on such matters as food standards, there should be regulations concerning how these are to be conducted, who may present evidence, how records are to be kept and how these are to be made available to interested persons, how final decisions are to be made, and how appeals may be made.

#### Policy Statements or Interpretations

Policy statements or interpretations are often needed for industry guidance. For example, certain exemptions may be allowed as in case of the labelling of very small packages; interpretations may be needed; or the enforcement of certain provisions may be deferred to give industry time to take steps needed to enable them to comply.

#### Regulations Should be Tailored to Specific Needs

Other regulations may be needed to facilitate administration, to ensure periodic review of activities of food control officials. It is impossible to foresee what regulations may be needed in every country under all circumstances. Official agencies in each nation should try to promulgate regulations fitted to their specific needs.

### **C. FOOD STANDARDS**

#### Food Standards Are Needed for Purchasers, Food Control Officials, and Magistrates

Food standards are helpful for the orderly marketing of foods and for effective application of food control laws. Without food standards the purchaser may have no assurance that a packaged food will be of the identity and quality he expects. Traders in distant markets cannot buy with confidence if there are no standards by which they can specify the kind and quality of food to be delivered. The guidance provided by food standards is helpful to inspectors and essential to food analysts. Without standards the analyst knows neither what assays should be made nor whether his results indicate that a food is violative or non-violative. The magistrate or court must have standards by which to judge whether foods, in fact, violate the law. In the absence of standards, cases involving adulterated foods may have to be dismissed. Uniform standards intelligently applied promote trade to the eventual benefit of producers, processors, traders and consumers. They can be a powerful tool in upgrading the quality of foods. That food standards can and do facilitate international trade has been demonstrated by the great increase in trade between nations of the Central American Common Market where there was a ten-fold increase in 12 years.

### What a Food Standard Includes

To serve its purpose a food standard should include the following provisions: The food should be fully and accurately described; the scope of the standard should be indicated; i.e., whether it applies nationally, regionally or internationally. Its essential composition and quality factors should be specified. This should include both optional and mandatory ingredients with any minimum or maximum levels of use. The packing medium may be specified. Chemical and physical indices and any tolerances for defects should be specified.

Permitted additives should be listed with any restrictions on use indicated. Sometimes standards include maximum permitted levels of contaminants such as arsenic, copper, and lead; or of other constituents which are undesirable.

Standards may require compliance with specific codes of practice. In standards for certain foods specific hygienic provisions, including microbiological end-product specifications, are indicated. For example, standards for milk and milk products may specify maximum levels for total plate counts, E. coli, and chemical indices of microbiological spoilage.

Specifications about weights and measures may be included, such as a requirement as to whether net contents are to be declared in terms of volume, weight or drained weight or size and number of units within the package. Minimum fill of containers may be prescribed.

In addition to compliance with general labelling requirements, standards sometimes include specific requirements, such as descriptions of processing ("pasteurized", "reconstituted", "sterilized", or "frozen"); of form ("sliced", "chunks", "crushed", "fillets", etc.); or precautions about storage or use.

Methods of sampling and analysis must be specified to ensure uniformity in procedures and in interpretation of results. This may be done by reference to published methods or a full description of the method to be used.

### Government, Industry, Scientists and Consumers Should Contribute to Standards Development

Obviously, the preparation of a food standard involves the gathering of much information and the cooperative efforts of many people. To the extent practicable, the establishing of a standard at the national level should indeed be a national effort based upon contributions from the government, the food industry, the food trade, the scientific community and consumers. This may often be done through a committee or committees.

### Government Responsibilities

**The government should assume responsibility for:**

Establishing the rules and procedures to be followed in accordance with the national constitution and specific legal requirements.

Proposing that a food be standardized, or acting upon such proposal submitted by industry, consumers, or other interested persons. The rules for submission of proposals should be made known to all concerned.

Gathering of needed information through committee meetings and interviews with members of the affected industry; through inspections to ascertain formulas, processes, control procedures, industry standards or norms, and hygienic practices.

Collection and analysis, when necessary, of samples for composition; for physical, chemical and organoleptic properties; for unavoidable contaminants; for international forms of adulteration and means of detection.

Arranging for and keeping records of all meetings, public hearings, etc. These records should be public and open to all interested parties except where confidential information such as secret formulas or processes may be involved.

Arranging for the drafting and publication of the proposed standard, with invitation for all interested persons to submit comments within a specified time limit.

Arranging for the review and consideration of all comments, and if necessary the gathering of additional data needed to resolve conflicting claims.

Arranging for publication of a final standard in a prescribed format.

Industries and trade associations should participate

Industry should assume the responsibility for:

Supplying technical information about composition; good manufacturing practice and processes; the availability of control methods, including chemical, physical and microbiological testing.

Seasonal variations or other differences in raw materials which may affect the composition of the final product, or the need for chemical additives. For example ice cream manufacturers may need to use different stabilisers according to the seasons, or may need to use dried instead of whole milk, or butter rather than cream as the source of fat when fresh milk supplies are low. These technical data should be made part of the record before the standard becomes final.

Determining the effect that proposed standards will have on costs, and whether a proposed standard would give an unfair or monopolistic advantage to one segment of the industry. For example, difficulty in establishing standards for orange juice drinks may arise from the great differences in the colour, flavour and types of oranges in different areas, and the desire of each area to have standards which would give its industry an advantage. The effect of specifications on price should be considered - if the standard increases costs unreasonably, many consumers may be priced out of the market.

Providing information about current and attainable levels of hygiene. Standards should not require industry to reach impossible levels of hygienic practice; neither should they permit the continuation of practices which place the health of consumers in serious jeopardy.

Making projections concerning the impact of proposed specifications on trade, both internal and international. Improved standards can undoubtedly help increase consumer confidence and hence promote trade, unless the standards increase costs so greatly that the complying manufacturer can no longer compete with some other segment of the food industry. In all countries, industry and trade associations usually have a tremendous store of technical and financial data and are in position to conduct any surveys needed to obtain additional information. They can and should make valuable contributions to the establishment of standards. At the same time the interests of the small entrepreneur and cottage industries should be protected through representation on standards making bodies.

Scientists and technologists should provide certain data

Food scientists, technologists, medical and veterinary experts, sanitary engineers, nutritionists, marketing experts in food related fields, when available, should be expected to supply:

Information about current practices in food processing quality control and about advances in food technology and equipment.

Information about the effects and safety of food additives and pesticide residues. Also, information about current levels of naturally occurring toxicants and the means available to reduce the levels of these. Information about microbiological, chemical or other contaminants and how to remove, reduce, or control these factors which adversely affect health or quality. Available analytical methods and possible improvements or modifications of these to meet specific problems encountered in connection with proposed food standards. Sometimes a desirable control must be "delayed" until solution of certain problems can be achieved through research - the need to destroy Salmonella in egg magma prior to freezing was recognized for many years before a practical process for pasteurizing eggs was developed.

Information on dietary habits and probable effects of proposed standards on the nutrition and diets of people. A requirement that salt be iodized has practically wiped out endemic goiter in various areas. In other areas mandatory enrichment of flour, bread, and rice has decreased the incidence of pellagra. Sometimes in the development of standards there are those who seek provisions which could have an adverse effect on the nutritive value of the food.

Nutritional expertise is needed to ensure that proposed processing or other procedures will not unnecessarily destroy nutritional values.

#### Consumer contributions

The weakest link in the cooperative chain of standards developments is usually the consumer. Even when interested, the consumer may be unable to attend conferences or communicate with authorities. When he does attend he often lacks the knowledge of food science and related matters to make an effective presentation. The main reason is that he is seldom organized and does not have an established forum in which to air his views.

Organized consumer groups in many nations are now insisting on having better representation in public hearings which affect them.

Information and comments from consumers are needed to:

Determine their understanding about and expectations concerning the food under consideration. The attitudes toward the use of proposed additives, particularly colours, flavours and other so-called "cosmetic" additives. Even views which seem irrational need to be considered if these are going to have a serious impact on consumers acceptance of the food.

Most of all, there is a need to know the views about consumer understanding of and attitude toward proposed label statements. Even in nations with high educational levels, there is some uncertainty about the consumer's understanding of some label statements.

#### Advantages of Utilizing International Standards

One advantage of utilizing international food standards is to facilitate trade between nations. Great differences in national standards can become a non-tariff barrier instead of a help to international commerce. Therefore, careful consideration should be given to the standards of nations with whom trade may be expected. Regional uniformity of standards can often be helpful but the widest benefits are provided by world-wide standards such as those elaborated by the Codex Alimentarius Commission. For this reason, a nation in elaborating its national standards should carefully consider existing international standards and try to harmonize its standards with these.

International standards are being developed by the Codex Alimentarius Commission (See Appendix XI, pages 92-106.

When developing countries adopt the standards elaborated by the Codex Alimentarius Commission they receive the trade benefits of world-wide standards. At the same time they will be able to take advantage of the contributions already made by other governments, food industries, scientists and consumers in gathering the information needed to develop sound standards.

A List of recommended international standards adopted by the Codex Alimentarius Commission may be found in Appendix III, pages 75-77.

Appendix IV (pages 78-79) contains a List of Standards for Milk Products adopted by the Joint FAO/WHO Committee of Government Experts on the Code of Principles Concerning Milk and Milk Products and sent to Governments for Acceptance.

#### Benefits of membership in the Codex Alimentarius Commission

Every nation, regardless of its degree of economic development or affluence can benefit from membership in the Codex Alimentarius Commission. Each can contribute to the development of effective standards. Even those countries which lack funds to send representatives to meetings of the Commission or subsidiary bodies can participate through submission of written comments, thus ensuring that any proposals they wish to make including any conditions peculiar to their area will be considered before a standard is accepted. By working within the framework of the Codex Alimentarius Commission, each nation can help facilitate world trade in foods to the benefit of its own as well as other farmers, processors, exporters, importers, and consumers.

#### D. FOOD HYGIENE

##### Training in hygienic practice can save food

Enormous quantities of food are needlessly lost through mishandling during harvesting, storage, transportation and preparation. Failure to properly protect food against physical damage, contamination or spoilage is seldom intentional. Usually the losses are caused by ignorance often accompanied by carelessness and indifference due in part to a belief that such losses are inevitable. When owners can be shown how to hold down their losses, and motivated to do so by promise of economic gain or fear of legal sanctions, savings can be tremendous. They must be shown how to protect foods against rodents and insects and how to safeguard foods against contamination by microorganisms.

A good food law and codes of hygienic practice intelligently applied can stimulate better marketing practice to the benefit of sellers and consumers. Gaining the acceptance of hygienic practice which will safeguard both the quality and the safety of foods is one of the most difficult but essential of food control activities. There is no need to wait for the development of elaborate hygienic provisions to begin quality improvement. Even a poorly educated shrimp fisherman can be shown the advantage of washing down and cooling the deck with seawater before dumping shrimp from the trawl onto it. Any peanut grower can be shown how to turn over his vines to expose the peanuts to air and sunshine to promote drying without his having to know that he is thereby improving his chances of protecting the nuts against moulds and aflatoxin. Even simple measures to ensure that grain is well dried before storage and is protected against insects and rodents during storage can cut losses and prevent deterioration in quality and safety. Simple precautions and care in handling can reduce physical damage to fruits and vegetables.

As the distances food is to be transported increase, and the processing grows more complex, the chances of contamination multiply and the protection of the food against contamination becomes more difficult. Hygienic guidelines accompanied by training of food handlers become essential.

##### Developing codes of hygienic practice

Codes of hygienic practice are most likely to be accepted and put into effect if the government, members of the food industry (especially persons responsible for sanitation and quality control), the scientific community and consumers have all participated in their development. Since these codes are basically voluntary, it is very important to enlist the cooperation of industry members during their preparation. Input from scientists, especially microbiologists and experts in food sanitation, is essential. Consumers should be kept informed, and if well-informed may sometimes take part in the preparation of these codes, the ultimate effectiveness of which will depend largely upon the community standards of general hygiene and the degree to which consumers refuse to tolerate insanitary conditions in food establishments.

Hygienic conditions differ, not only between countries, but between industries and segments of the same industry within each country. It is therefore impractical to devise a rigid programme of improvement; the programme should be fitted to the circumstances, though the goal to be achieved should always be to produce safe, sound, wholesome foods which are fit for human consumption.

Usually the first step involves a survey to find the causes of contamination and quality degradation. This includes attention to factors which contribute to contamination, spoilage or quality deterioration of raw materials during harvesting, storage and transport. Finished products of good quality cannot be made from raw materials which have decayed, spoiled or become unfit for use. In case of processed foods the survey should extend to methods of processing, packaging and storage and to the environment within which the product is handled. Until the problems are recognized and defined it is impossible to plan corrective measures.

Once the problems have been defined, the next logical step is to decide on the objectives to be achieved on a short term and on a long term basis. Short-term objectives should be attainable. If objectives are impossibly high, compliance will be discouraged; if too low there may not be enough motivation toward improvement.

The programme of inspection and quality control can then be planned, taking into account available resources of money and manpower, the time needed for training food handlers and managers, and the availability of materials and technique needed to improve buildings and equipment used in the production and storage of food. Priority should be given to correction of practices or conditions which are hazardous to health; for example to require adequate processing of low-acid canned foods to prevent development of botulinus toxin.

Once the programme has been planned and goals set, there should be periodic reviews of progress. As goals are achieved new plans should be made for continued improvement of hygiene.

It is advisable to provide a preparatory period before regulatory standards are made mandatory, especially if there are to be radical changes of existing practices or conditions.

New regulations with regard to buildings can be made effective immediately for new plants, while existing plants are given a reasonable period within which to make required changes. A period of voluntary rather than mandatory compliance gives both management and food handlers a chance to learn and adjust to the new requirements. Consumers will be best protected when both management and food handlers achieve such proficiency that they work with confidence and are proud of their products.

In many areas the principal restraint on hygiene is the lack of water. Operators of existing food plants should do everything possible to obtain pure and adequate water supplies. New plants should be located where water is available.

#### Content of codes of hygienic practice

In general, the codes of hygienic practice deal with the raw material requirements (including environmental hygiene in growing and production areas, hygienic harvesting and preparation, and protection during transportation); processing plant facilities including construction layout, equipment and utensils; hygienic operating requirements and practices including laboratory control; health requirements for foodhandlers; and where appropriate, end product specifications.

#### Codes of hygienic practice elaborated by the Codex Alimentarius Commission

The codes elaborated by the Codex Committee on Food Hygiene can be of great value to developing countries for use as guidelines and for educational purposes, even when conditions do not permit immediate application of all provisions of the Codes. The Committee has elaborated a Code of Practice on General Principles of Food Hygiene.

Codes of hygienic practice for certain foods have been adopted by the Codex Alimentarius Commission. Other codes for specific types of foods are at different stages in the process of elaboration and adoption. Also, the FAO Fisheries Department is collaborating with the Committee in elaborating codes of both technological and hygienic practice for various fish and fishery products.

A Codex Committee on Meat Hygiene is developing a code of practice for fresh meat and a code of ante-mortem and post-mortem inspection of slaughter animals for human consumption.

The governments participating in the work on Codes of hygiene concluded that, as a first step, codes should be elaborated which will help all countries engaged in international trade in foods. First priority has been given to products which can present serious public health hazards.

It is hoped that these codes will not only prove helpful to developing countries, but that they may eventually form a basis for international agreement as basic hygienic conditions necessary to ensure that food is safe and fit for human consumption.

A list or recommended codes of hygienic practice adopted by the Codex Alimentarius Commission may be found in Appendix V, page 80.

Appendix VI page 81, contains a list of codes of practice developed by FAO Department of Fisheries, Fishery Products and Marketing Branch.

### Codes of hygienic practice should be harmonized

Codes of hygienic practice are not only essential to protect the quality and safety of foods, but like food standards, they should be harmonized to protect international trade. Every nation is concerned that the foods it imports be safe and fit for human consumption.

The Codex Alimentarius Commission has found that the elaborating of international codes of hygienic practice involves the solving of a number of important problems. Representatives from developing countries repeatedly assert that due to climatic or environmental conditions, the state of development of their food industries, and the lack of trained food handlers, their food industries cannot possibly comply with the hygienic standards being considered at meetings of the Codex Committee on Food Hygiene. While primitive handling practices and antiquated facilities cannot be replaced overnight, a beginning must be made if unsatisfactory conditions are ever to be corrected.

It is true that advanced codes of hygiene should not be adopted even taking into account their advisory nature when there is neither the will nor the ability to apply them. On the other hand, they should not be totally rejected simply because they cannot be put into immediate effect. A better solution is to consider them as goals to be reached eventually through gradual improvement of sanitation and hygienic practices. Even with small but concerted efforts applied over a long enough time great progress can be made in this direction.

### Microbiological standards

Safety and keeping qualities of foods are closely related to their microbial content. Microbiological standards have been proposed for various foods but only those for pasteurized milk have been widely adopted. Even though there has been some controversy about establishing microbiological criteria for foods, experience has shown that such standards when adopted improve the hygienic quality of products, and can stimulate processors to improve plant sanitation and quality control. Microbiological examinations may in addition bring to light defects which were not apparent during physical inspections of the plant; such defects can then be corrected. Standards are especially useful in controlling the quality of foods which are consumed far away from the processing plant; thus they offer a valuable means of quality control over imported foods.

Work has begun in the FAO/WHO Food Standards Programme on microbiological specifications for foods, and the Joint FAO/WHO Expert Consultation on Microbiological Specifications for Foods will provide guidance on establishing acceptable microbiological specifications for foods which require them. See also Appendix VII, page 82.

## E. FOOD ADDITIVES

### Food additives preserve and enhance food value

Since World War II food additives have been increasing in numbers and volume. Preservatives delay spoilage caused by bacterial activity, fungus and mould. Anti-oxidants delay the development of rancidity in fats and fatty foods. Food consistency may be improved and maintained for a longer time by gelling agents, stabilizers and emulsifiers. Colouring matters and flavouring agents make food more attractive and tasty; unfortunately they may also be misused, to conceal inferiority or make foods seem better or more valuable than they actually are. Regulations are needed to prescribe safe conditions of use and to prevent deception.

### Food additives use needs control

Some preservatives and flavouring materials such as salt, vinegar, wood smoke and certain spices have been used since ancient times with no apparent ill-effects. Most chemical food additives have been used only for a short time. Some are of unknown toxicity; others are known to be so toxic that their use must be all the more carefully controlled. Many have not been adequately tested to determine their safety. Extensive testing is needed to determine whether and under what conditions these may be safely used.

The control of food additives is a complex problem which can best be handled through regulations promulgated under authority of the general food law. Preferably the basic law should prohibit in general the addition to foods of chemicals the use of which has not been demonstrated to be safe. Countries also may require proof of need for an additive before it is approved for use. The lists of permitted or prohibited additives, and levels of use of specified additives may then be included in detailed regulations.

When lists of additives are included in food legislation, any changes in the lists require legislative action. This may delay changes even when there is new scientific evidence to show that a previously permitted additive is dangerous to health.

The toxicological testing and evaluation of food additives is quite expensive and requires many competent scientists. Even the more affluent countries take into account the evaluations made by international agencies.

#### Use of positive and negative lists

Countries have sought to control additives through: (1) positive lists, (2) negative lists, or (3) mixed systems. Positive lists should be the goal of legislators. Many countries with comprehensive food additive regulations use positive lists of additives which may be used under specified conditions. Positive lists usually specify: (1) the chemical identity of the additive, (2) acceptable uses or functions (which may include definite lists of foods in which it may be used), (3) acceptable limits or tolerances. Often purity specifications may be included - for example certain food colours which may be used in the U.S.A. must be from batches analysed for the Food and Drug Administration and certified to meet specified standards of identity and purity.

A positive list includes all permissible additives, those not on the list are assumed to be prohibited.

On the other hand, a negative list indicates only those additives the use of which is illegal, and implies that all those not listed may be used whether their safety has been established or not.

Some nations have found it advantageous to use a mixed system, which includes a negative list of substances which may not be used in food under any circumstances and a positive list. Particularly in the beginning, the positive and negative lists may not include all additives, some of which have a long history of safe usage. Some nations have made special provisions permitting continued use of these substances for a time.

#### Food additive regulations should be based on toxicological testing and evaluation

The Codex Alimentarius Commission scrutinizes closely all proposed uses of food additives, considering the safety of and technological need for the additive. The scientific evaluation of food additives is done by a Joint FAO/WHO Expert Committee on Food Additives which acts as an advisory body to the Codex Alimentarius Commission. The Committee collects and evaluates data internationally on the technical uses, specifications and toxicity of food additives. Some of the adverse effects of food additives have been attributed to contaminants. Therefore, identity and purity specifications are essential to safe usage.

The advice of this Expert Committee about the safety of a particular food additive is used in deciding upon the acceptability of limits for food additives proposed by Codex Commodity Committees dealing with individual standards. A proposed use is accepted only if: the need for such use has been established; the amount used will be no more than is necessary to achieve the desired effect; and the potential daily intake will be within the Acceptable Daily Intake established by the FAO/WHO Expert Committee on Food Additives.

The Codex Alimentarius Commission has approved some 500 specific food additive provisions in Codex standards. It has established a list of additives which it considers safe for use in food and a list of those it considers unsafe for such use. These lists will be revised as investigations continue.

The General Principles for the Use of Food Additives, adopted by the Codex Alimentarius Commission may be found in Appendix VII.

#### Contaminants

Some contaminants enter foods as the result of environmental conditions beyond the control of the individual food producer or manufacturer. Other contaminants result from intentional and controllable use of substances at some stage in the growing, storage, processing or packaging of the food. Regulation should prescribe maximum safe levels of contaminants regardless of sources, and monitoring systems should be established to detect and remove from the channels of commerce any foods bearing residues in excess of the safe tolerances.

In case of environmental contaminants such as arsenic, lead, mercury, selenium, cadmium or other heavy metals, or industrial chemicals such as PCBs, regulations may be limited to prescribing maximum safe tolerances. These may be embodied in individual food standards or be the subject of more general regulations.

Among the contaminants which appear in or on foods as the result of uses which are intentional and at some stage controllable are pesticides (dealt with in the following sub-chapter); veterinary drugs and growth-promoting chemicals whose use may leave residues in meat, milk or eggs; and substances used in the manufacture of packaging materials or other food contact surfaces from which they may migrate to food. In a few countries these are regulated as "indirect additives". In any case, there should be regulations to require that persons proposing the use of such substances arrange for whatever experimental work and pre-testing is needed to prove that when prescribed procedures are followed there will be no unsafe residues in finished foods. Usually the regulations will include safe maximum tolerances for residues in the finished food. Sometimes they may prescribe the testing procedures and analytical methods to be followed.

#### Food irradiation should be controlled

The irradiation of foods requires control to ensure that the treated food will be safe and fit for human consumption and to protect against other hazards associated with irradiation. In some countries safe conditions for use are prescribed in food additive regulations; in many countries irradiation is not considered a food additive and its use is regulated separately. However, it may be accomplished; control is essential. To be effective, controls should require monitoring of the food irradiation process.

In establishing controls for irradiation of foods, a useful guide is available in the Recommendations of a Consultation Group on the Legal Aspects of Food Irradiation which may be found in Appendix IX, page 84.

#### Developing nations should control additives to the extent of their capabilities

Developing nations may not always have the sophisticated analytical equipment and highly trained personnel needed to analyse foods for minute quantities of food additives. Nevertheless they should exercise such control as they can. As food additive uses increase to meet the need of new processing methods and to preserve the quality and nutritive value of foods during transportation, storage and marketing, the need for control becomes essential. Also, exporting nations must control the use of food additives to make sure that exported foods will not be rejected because they contain additives which are prohibited in the importing country. Regulations are needed to ensure that imported foods will not contain unsafe additives. Such regulations might include a requirement for certificates to indicate that foods contain only additives the use of which is permitted by the exporting nation. They might require certificates to state that the foods comply with recommendations of the Codex Alimentarius Commission.

## F. PESTICIDES

### Controls are needed to ensure safe use of pesticides

The use of pesticides to protect stored foods, for better control of insects and rodents in food establishments and to eradicate or control certain insect-borne diseases have been mentioned. Even greater volumes of pesticide chemicals are used to increase production of food crops. Seeds are protected by fungicides. Growing crops are protected against insect, microbiological and plant pests by insecticides, bactericides and herbicides. After harvest the stored foods are protected by fumigants and rodenticides.

While some of these chemicals may be used without great hazard to health, others are so toxic that strict controls are needed to protect humans, animals and the general environment. The most poisonous may need controls at every stage of manufacture, transportation, storage and application. Labelling must always be regulated. Some pesticides quickly disappear or are broken down into harmless degradation products. Others are very persistent or break down to form even more poisonous substances. These may leave unsafe residues on foods. To protect the health of consumers there must be regulations to control such residues of pesticides and their degradation products. Since unsafe levels may appear in milk, meat or other products of animals eating the treated crops or from direct use on animals, the control of pesticide levels in these products is important.

The problems involved in ensuring safe usage of pesticides are very complex. Usually the responsibility for controls is shared by several departments or ministries and governed by laws other than food law. Environmental protection agencies may be responsible for regulating manufacture and usage to prevent environmental damage. The ministry of agriculture should determine what constitutes good agricultural practice and teach farmers and applicators to follow these. Transportation agencies may regulate shipments to prevent accidental contamination of foods during shipment. Several agencies may cooperate in the promulgation of regulations to establish safe tolerances for residues. Likewise, several agencies may participate in control of labelling. Food control officials should participate in development of the regulations needed to protect health, and should have authority to remove from channels of trade any foods rendered unsafe by pesticide contamination.

### Transportation regulations are needed

Health hazards may result from spillage of pesticides onto foods during shipment. In several instances hundreds of persons became ill and some died due to spillage of potent chemicals such as endrin or parathion onto foods carried on the same ship or truck. Regulations need to be promulgated under appropriate laws other than food laws and enforced to prevent such tragedies.

Many governments have passed laws or promulgated regulations to prohibit the shipment of poisonous pesticides on the same vehicle with foods. Some countries have laws which require that when ships or aircraft arrive with certain poisons (including pesticides) on board the Collector of Customs must be notified, and no containers may be moved until inspected. If there is evidence that foodstuffs may have been contaminated, these foodstuffs may not be landed; or they may be landed only to be held for subsequent re-shipment, destruction, or other approved method of disposal. Even the less affluent developing countries can provide the inspection needed to enforce such measures to protect the public health.

### Regulations are needed to control food seeds treated with fungicides

Incidents involving very large numbers of deaths and serious illness have resulted from the eating of food grains previously treated with organomercury fungicides. The most serious of these have occurred in countries without effective seed control regulations. Though such poisonings have also occurred in some countries with good inspection services the numbers of illnesses have been kept low.

To prevent outbreaks of poisonings from seeds treated with these fungicides, the following measures are needed:

Laws or regulations should require that the treated seeds be distinctively coloured. Laws or regulations should forbid, under heavy penalty, the sale of such seeds for human or animal use and the mixing of such seeds with others intended for consumption by man or animals.

There should be an educational programme to teach the public how to identify the treated seed and why these should never be used as food. Non-used treated seeds should be destroyed.

#### Special training is needed for the safe use of some pesticides

Some pesticides such as hydrogen cyanide gas and organophosphates such as TEPP are so dangerous to users and any other exposed persons that their use should be restricted to persons especially trained to protect themselves and others. Thallium and the rodenticide, sodium fluoracetate, (1080), are so deadly that, if their use is permitted at all, they should be used only by persons trained, licensed and held strictly accountable for their use.

In the USSR no person may work with poisonous chemicals unless he has undergone each year a suitable course of instruction and holds a certificate. Venezuela law provides that pesticides may not be applied on premises or inside establishments where foodstuffs or pharmaceutical products are produced, stored, supplied or consumed, unless the prior approval of health authorities has been obtained. While such stringent controls may not be needed or desirable for less hazardous pesticides, they should be applied to those which are especially dangerous to users and the general public.

#### Labelling should be regulated

Because of the possibility of accidental poisoning every pesticide container should be labelled with the name of each active ingredient and with directions for emergency treatment, including any antidotes.

Many illnesses and deaths have followed the re-use of pesticide containers to store foods, water or other beverages. Containers should bear prominent warnings against re-use. Preferably these should include graphic materials which will make the message clear even to those who cannot read and understand the language. People should then be taught to avoid the re-use of containers bearing these symbols.

Finally, labels should include directions for use which, if followed, will protect the health of the user and of the general public, while ensuring effective application. Whenever a pesticide is intended for use on food crops the directions for use should be in accordance with good agricultural practices, and should not result in unsafe or illegal residues on the food at time of harvest.

#### Regulations should fix safe tolerances

To protect consumers against unsafe residues which may result from unfavorable conditions or from careless or improper use of pesticides on food crops, regulations should be promulgated to fix maximum permissible levels of unavoidable residues.

The establishment of such tolerances which will protect consumers while permitting effective use of pesticides requires the accumulation of much data which must be evaluated by qualified experts. While developing countries may lack the experts and other facilities to do this, they can protect the health of their people by adopting the tolerances recommended by the Codex Alimentarius Commission. A list of publications on pesticide residues in food may be found in the bibliography.

## G. FOOD LABELLING

### Detailed regulations concerning food labelling are needed

A food law should include general provisions concerning labelling with detailed regulations promulgated separately. At the minimum the law should prohibit statements which are false and misleading and should require accurate descriptive labelling. Some laws are detailed in their provisions concerning labelling; others are more general. In either case, detailed regulations are needed. The purpose of labelling is to provide consumers with the facts they require in order to make informed choices in the market place. To do this the label should always bear: a statement of identity; a declaration of the net contents; the name and address of the manufacturer, packer, or distributor; and a listing of ingredients.

In addition, the labelling may include: the country of origin, a date indicating either the date of packing or last day on which the article should be offered for sale, statements about the nutritional qualities of the food, any directions needed concerning storage or preparation, and statements concerning grade or quality.

### Identity

It is essential that a package food be labelled with a declaration of its identity. This may be a common or usual name, known and understood by consumers. It may be a name prescribed by a standard; if so, the law should require that the food comply with the standard. Many of the newer fabricated foods have neither an established common or usual name, nor a standard of identity. Such foods sometimes bear fanciful names which may be meaningless to most purchasers. Such foods should be labelled with a description which will inform purchasers as to the nature and possibly the composition of the food, as for example, "smoke flavored soy bean protein", or "70 percent cottonseed oil 30 percent olive oil".

The name of the food should be accompanied by any needed descriptive or qualifying term, such as: "pasteurized", "reconstituted", "sterilized", "granulated", "powdered", "fully cooked", "quick frozen", etc.

### Labelling imitation foods

Sometimes foods are intentionally made to imitate or simulate well-known foods. Consumers will be confused unless these are prominently labelled as "imitation" or otherwise differentiated from the usual food. The problem of determining whether a food actually does "imitate" another has led to many legal contests. It is often argued that use of a fanciful name followed by a description of the food may be more informative to consumers. Thus a substitute for fruit jelly might be labelled: "artificially coloured, artificially flavoured, artificially sweetened". A meat pie substitute made in part from isolated soy protein, might be labelled "made with ... percent meat and ... percent soya protein". It is probable that there will always be differences of opinion as to how to best label these substitutes, but certainly they should bear statements which unequivocally explain their identity to prospective purchasers. It may be that after long usage, an imitation food may acquire an identity of its own, as has happened with margarine.

### Net contents declaration

Cheating on weights and measures has been occurring since man first began the marketing of foods. Without the general use of standard weights and measures both producers and consumers are likely to lose. While countries usually have separate laws to control weights and measures a food law should include a requirement that packaged foods be labelled with an accurate declaration of weight or volume in terms of some standardized system. The declaration should be in terms understood by the consumer.

The metric system is most widely used. The use of avoirdupois weights (pounds and ounces) and of measures in term of gallons, quarts, pints, and fluid ounces, though still widespread is giving way to the metric system. Any country which must, in order to inform its own people, declare weights and measures in terms other than metric would be well advised to

provide for dual declaration in terms of both systems on either a voluntary or mandatory basis. Firms planning to export foods almost always use the dual declaration. This not only facilitates international trade, but serves to educate purchases within the country concerning the relationship of the two systems.

The best contents declaration should be made in the following manner:

for liquid foods, by volume;  
for solid foods, by weight, except that when such foods are normally sold by number a declaration by count may be made;  
for semi-solid or viscous foods, either by weight or volume.

If a food sold by count is of unequal or irregular sizes, a declaration in terms of both count and weight is most informative. Customary declarations concerning semi-solid or viscous foods vary. Unless there is a well-established custom of declaring either in terms of weight or volume, the contents may be declared by both.

Sometimes regulations require declarations in terms of net drained weight, especially when the packing medium is discarded before consumption. Some products lend themselves to this type of control even when the packing medium is not discarded. Others, such as canned fruits, present problems caused by unavoidable differences, due to variety, season, degree of maturity, size of units, and other variables.

Some countries have specific regulations concerning fill of container. These are needed to prevent consumers being misled by slack-filled containers. These can be misleading even when the net weight or net volume declaration is accurate.

Name and address of the manufacturer, packer, distributor, importer, or vendor

The label should bear the name and address of the person who assumes primary responsibility for distribution of the food, whether this be the manufacturer, packer, or distributor. If the name on the label is not that of the manufacturer or packer it should be qualified by terms such as: "distributor", "distributed by", "packed for", "imported and distributed by", or other terms showing the actual part played by the firm or person named.

The address should be complete enough to permit delivery of mail or other messages from consumers, dealers or government agencies. In some cases this would require inclusion of the actual street address. Sometimes, when a firm manufactures or packs food at several places, the address may be that of the principal place of business. If so, this should be indicated by some term such as "principal office", "main office", or some similar explanatory statement. The regulations of some nations require that the actual producing factory be identified at least by code. This information can be most helpful when defective foods are found on the market.

Sometimes the manufacturer, packer, or distributor uses a name other than that of the corporation of which it is a division or subsidiary. Some regulations require that this relationship be shown by a statement such as "Division of ..." or "Subsidiary of ...", the blank to be filled with the name of the parent firm.

List of ingredients

Although there are variations in detail, most food control laws require a listing of ingredients. Usually it is required that ingredients be listed in descending order of predominance by weight. Regulations may require that every ingredient be listed by its common or usual name.

Exceptions from the above rule are sometimes made. Some consider it more informative to list certain additives by function or class rather than by long specific chemical names which are meaningful only to scientifically trained persons. For example the term "antioxidant" may be more meaningful than "butylated hydroxyanisole", or "thickening agent" than "propylene glycol alginate".

In some cases, changes in the availability of ingredients may make it impossible for manufacturers to know in advance just which type of fat they will be using, so they may be permitted to simply declare "vegetable oils" rather than naming the specific type such as "arachis oil", "cottonseed oil" or "soybean oil".

This type of listing is recognized by the Codex Alimentarius Commission in their "Recommended International General Standard for the Labelling of Prepackaged Foods". Opposition to this type of labelling may come from consumers and consumer groups who wish to know specifically the names of all ingredients used; from allergists and those who suffer from certain allergies who need to know whether specific ingredients such as cornstarch or wheat gluten are present; or from religious groups who wish to avoid ingredients from certain sources. Each nation must carefully weigh its own problems and decide whether to require that all ingredients be listed by their specific names or what exceptions may be allowed.

Sometimes regulations require that the listing include specific percentage declarations of either expensive or essential ingredients, or of diluents such as water or alcohol.

Some regulations require that artificial colours, artificial flavours, artificial sweeteners, or chemical preservatives be identified as such in the list of ingredients.

Some nations require that the name of a food be suitably modified to indicate the presence of artificial colour, artificial flavour, or artificial sweetening.

#### Country of origin

Many countries require that all imported foods bear a declaration naming the country of origin. Any developing country considering exportation of foods should include in its labelling regulations a requirement that package foods be labelled with the country of origin.

In any case, the country of origin should be declared if its omission would be misleading. Certain varieties of cheese, wine, beer, tea, coffee, spices, and flavours have become associated with original producing areas. Therefore, the declaration of the country of origin may be important to the consumer, and its omission may be misleading.

#### Code marks

Food manufacturers usually identify food packages with code marks which enable them to identify the date and place of packing, and possibly specific manufacturing batches. These code marks are useful to food control officials, especially if they have access to the key to the code. They are most helpful when it becomes necessary to segregate lots of contaminated food from lots which are not violative or to trace contaminated foods to their source. However, these code marks are not helpful to consumers who cannot decipher them.

#### Dating of foods

There is an increasing demand from consumer groups for the labelling of perishable foods with the date of production, a final date for sale, a final date for use, or all three. A final date for sale or use is more meaningful to most consumers. Industry representatives frequently oppose such mandatory date labelling, claiming that it will not serve the best interests of consumers. It is generally recognized that conditions of storage affect the keeping quality of foods. Under proper conditions a food may be of good quality after a week of storage, while under other conditions it might spoil within two days. If date marking is required it should be accompanied by storage instructions for dealers and consumers.

Foods often remain in good conditions after expiry dates. Destruction of such foods would cause needless losses, especially of scarce protein foods. To compensate for their losses, the merchants would charge higher prices. It has also been argued that to avoid such losses smaller outlets would cease to handle the perishable foods. This might restrict distribution to larger, higher volume retailers.

Consumers insist that they are entitled to know whether a perishable food is fresh and can be used without risk of important changes in its quality or safety. It is also claimed that date labelling will encourage merchants to systematically move their stocks to avoid any becoming outdated. This, of course, would reduce losses.

Foods bearing dates for final sale or use will often be safe and suitable for manufacturing or other use after the expiry date. To prevent unnecessary losses, regulations should provide that foods found by competent health authorities to be safe and suitable may be used under their supervision in manufacturing human foods or animal feeds.

#### Nutritional labelling

One purpose of food control services is to protect consumers against the nutritional debasement of foods; some food laws are definitely intended to improve national nutrition. With the increase in number and volume of fabricated foods containing many ingredients, it has become more difficult, if not impossible, for consumers to judge the nutritive value of these. At the same time these foods are supplying higher and higher percentages of the daily food intake. More than ever, consumers need to know which important nutrients they are receiving from these foods. At the same time there is a growing demand for foods made to fill specific dietary needs. Because of this, consumers are demanding that nutritional information be supplied on labels. Regulations may require information concerning protein, fats, carbohydrates, calorie content, vitamins and minerals on all enriched foods or those specifically offered as a source of any of these nutrients. Manufacturers of other foods, while not required to do so, are encouraged to include such information. The regulations require that nutritional information be complete and in a specified format. Such label requirements, when accompanied by appropriate consumer education, can do much to inform consumers of nutritive needs and to help them choose foods to supply those needs. When joined to compulsory enrichment of staple cereal foods, iodization of salt, and similar measures, nutritional labelling can help improve national diets.

A number of nations have some regulations requiring nutritional declarations on specified foods. More often than not these apply only to dietetic or infant foods. Even though experience with nutritional labelling has been limited, it indicates the need for educational campaigns to ensure that labelling declarations will be meaningful to consumers and that nutritional claims will not be misused as unjustified sales arguments. This may be especially important in developing countries where limited knowledge about nutrition lessens the ability of consumers to judge the validity of claims made on labels or in advertising.

#### Statements concerning storage and preparation

Sometimes, to protect the health of consumers, it is necessary to label packaged foods with certain cautionary statements. For example a frozen food should bear statements such as "store at -5°C", or "do not refreeze after thawing". Infant foods packaged with a high vacuum may bear a warning not to use unless there is a hissing sound or a "pop" upon opening. The labelling of baby foods should always bear directions for preparation. Pressurized containers may bear warnings not to puncture or store near heat. Better manufacturers usually include such statements, but regulations may sometimes be needed to make sure such declarations will always be included when needed.

#### International labelling standards

To protect consumers and facilitate international trade, the Codex Commission has taken two approaches to labelling standards. General rules are included in their "Recommended International Standard for the Labelling of Prepackaged Foods" and food standards include additional labelling requirements.

The complete text of the Recommended International Standard for Labelling Prepackaged Foods may be found in Appendix X.

### Declarations concerning quality or grade

Food labels sometimes bear declarations concerning grade or quality. Such declarations, if accurate and meaningful, can help consumers choose between foods which differ in quality and price. Provision for such grading is usually made under agricultural marketing laws, and grade labelling is often voluntary.

Grade standards and labelling facilitate marketing whenever buyers are too far from the source of supply to personally examine a commodity or when a food is enclosed in a sealed, opaque package. Grading systems which differentiate between superior and inferior products are particularly important in export marketing. It is uneconomical to export an inferior product whose transportation will cost as much as a product of better quality bringing higher prices.

Grading and the issue of inspection certificates can help government officials and other interested person fix responsibility for any deterioration in quality which occurs while a food is being transported or stored.

To serve these purposes grade standards should be so designed that they will be useful to as many producers, processors, traders and consumers as possible. They should reflect commodity characteristics which buyers recognize and value. The grading should be done by competent persons, whether they be government inspectors, qualified agents or employees of industry, or members of private testing organizations.

Grade standards need frequent review and revision to keep them in accord with changing consumer tastes and conditions of production. They should therefore be the subject of regulations rather than detailed specifications in the basic law.

Sometimes minimum quality standards are promulgated for certain foods. Foods, the quality of which falls below such standards, may be required to bear prominent declaration that they are substandard. Sometimes this declaration may be modified to indicate that the article is good food but not high grade.

### Food advertising and labelling claims

The Codex Committee on Food Labelling plans to prepare recommendations concerning food advertising with particular reference to:

claims which may be permitted or prohibited with reference to specific foods; misleading representations of foods.

These recommendations will also be applicable to false or misleading representations or claims on labels. Food laws often, but not always, prohibit false advertising and authorize the promulgation of regulations to specify precisely which claims or misleading representations are prohibited.

## CHAPTER VI

### A FOOD CONTROL INFRASTRUCTURE

An effective system for the implementation of national food laws and regulations will provide for an infrastructure with the following basic functions:

Administrative (at central or local level)

Inspection and sampling of foods

Analysis of foods

The administration is necessary to ensure effective supervision and control and to take follow up action as may be required on work of the field and laboratory staff; the inspectorate will inspect and sample foods and initiate appropriate action; and the laboratory service will analyse and evaluate foods as may be required and initiate action as well.

Although each will be given separate consideration, it is important that this group of functions be formed into a closed system of efficient management at the national level.

#### A. ADMINISTRATION

The most efficient administration will be achieved when there is a division of functions between local and central administrations, with the responsibilities of each clearly delineated. Because of wide differences in national and local systems of government, in legal philosophies, in forms of organization, and in the education and training of officials at various levels, it is impossible to prescribe a division of responsibilities which will be suitable to every nation. The following is a suggested division which individual countries may be able to adapt to their own situations. In any event, the division of responsibilities should remain flexible to meet new developments.

##### Functions

The administration may be divided in two levels.

The local administration may be responsible for:

- supervision over day-to-day operations
- follow-up action on the work of inspectors and analysts
- (coordination), consultation and cooperation with all who have responsibilities related to food control at his level
- planning programmes for the inspection, sampling and analysis of foods
- cooperating in the review and development of new regulations
- budget preparation to provide for costs of the service, including equipment and supplies needed by inspectors, analysts, clerical staff, etc.
- recruiting and providing for the training of personnel.

Whenever the law requires permits, licenses, registration of premises the local administrative staff handles these matters.

The central administration may be responsible for:

- initiating, developing and reviewing of regulations and enforcement policies
- coordination of all activities related to food control
- approval of the budgets and personnel organization on local services
- contact with foreign governments and organizations.

Whenever the law requires permits, licenses, registration of premises or of pre-packaged foods and these powers are not delegated to local bodies the central administrative staff handles these matters.

### Centralized Food Control at the National Level

Although well integrated national food control services are a relatively recent development, experience has shown the need for centralized national control at top government level. When food control is left to states, provinces or municipalities with no national supervision or control, divergencies in laws, food standards and enforcement procedures may introduce very unequal consumer protection and possibly hamper trade within the country. For these reasons 1) some countries such as Argentina, Brazil, India and some European nations have found it advisable to enact food laws, to set up national food control machinery and to exercise supervision from the national level. However 2) with appropriate coordination and supervision from a national service, local authorities can provide good food control as well, as has been demonstrated in Switzerland, where the canton system works very well. Thus a good food control administration at the national level with an overall responsibility for the implementation of the food law and the exercise of supervision with suitable delegation of powers to states or local bodies, when so required, has been found to be the best arrangement.

A unified administration at the national level can operate more efficiently and more economically than can smaller, separate organizations. Significant savings can be achieved nationally through optimum utilization of staff and facilities (inspectorate, analytical staff and laboratories), and through avoiding duplication of activities.

It has been noted that because of more adequate resources, a centralized national administration can usually offer better salaries and more chances for advancement than local government units. They can therefore obtain and retain more highly qualified personnel.

Also, at the national level, pressures from local groups which might impede effective implementation of food control programmes can, comparatively speaking, be more effectively withstood.

A unified administration at the national level can better carry out programmes for education, development and improved control services, for it can assign enough funds, on a priority basis, not only because of better resources, but also because of more qualified staff being available.

It is important that the government speaks with one voice concerning food control policies and interpretations of food laws. This can best be accomplished through a unified national administration; with divided control, members of the food industry or trade may be able to play off one agency against another to the detriment of consumer protection and the creation of confusion among regulated industries.

The central administration should be placed at a fairly high governmental level but many day-to-day operations of the service must take account of, and be conducted at, both national and local levels. It should not be overlooked that local government bodies play an important role in enforcement, due to their local knowledge and closer contact with local manufacturers, traders and consumers. The main objective is the periodic inspection of all producers of food for sale or barter to ensure that foods are safe and wholesome and that conditions in general, comply with statutory requirements. Food inspection at retail level is another main task. Where local authorities are given powers of enforcement, the central administration should supervise and coordinate programmes and the type and flow of samples where this may be required in the national interest of uniformity of application and otherwise intervene in emerging situations. Services at the local level could perform specialized activities, such as difficult or complicated analytical procedures.

Some nations appoint public analysts, many of whom operate independently. Such a system makes it difficult to plan programmes of sampling and analysis. For uniform enforcement and effective planning it is much better to have all analysts and inspectors under the supervision of a single national service. This applies to regional offices of the food control service as well as to the central laboratory and headquarters staff.

One of the important functions of the central food control administration is to develop food standards and regulations. Whenever legal provisions or established government policies require a separate standards making organization, there should be a clear policy decision about the role of each in the elaboration of food standards and about the level and extent of collaboration between the body responsible for elaborating standards and the food administration. In any case, food control officials should have authority to take appropriate action when foods deviate from standards.

Ideally all food control services should come under one administration, and the tendency to place food standards elaboration under a separate standards organization should be discouraged.

There has been a recent tendency to enact laws dealing with specific areas of food control such as egg inspection or seafood inspection, and to set up special agencies to administer these services. Along with this there has been a tendency to reassign some functions of food control to new agencies such as those established for environmental protection. Careful consideration should be given to the effect these tendencies may have since they can lead to fragmentation of food control supervision.

#### Consultation, Coordination and Cooperation

It is a national duty to stimulate and ensure consultation, coordination and cooperation between all organizations having an interest in or responsibility for food control. Even when there is a unified food control service there will often be overlap of activities with those of other agencies. For example, customs officials may collect samples of imported foods; they always become involved in the release of passable lots and in the detention and disposition of violative consignments. There will be areas of common interest or concern with Ministries of Health, Agriculture, Economic Affairs, Industry and Commerce, environmental protection agencies and possibly others. There should be regular consultations with consumer groups, scientific associations, groups to promote better nutrition and possibly others, aiming at better (new) regulations.

Where there is no unified administration a well thought out and detailed system for coordinating the activities of all food control agencies should be made obligatory. The advantages of such cooperation are quite obvious as otherwise a government cannot speak with one voice concerning policies relating to food, health, nutrition and consumer protection. It was to meet some of such problems that Sweden consolidated food control supervision.

Cooperation and coordination should not begin and end at the national level alone. These are functions of the entire national administration from the level of the operating inspector to the head of the service. To develop equally close cooperation and coordination with local officials having food control responsibilities all should be kept informed through frequent consultations and the regular distribution of information concerning food control and related matters.

#### Advisory Board or Committee

As was noted in Chapter IV on A Modern Food Law, that statutory provision for the establishment of a central advisory and/or coordinating body has been found very useful in many cases. The title of such a body can well be left to national preferences, its duties however are most important. The main responsibility for such a body will be to advise on matters arising out of the administration of the food act. It will determine matters of

policy to the extent that this is provided for within the framework of the food law, and because of its aim to achieve coordination, this body should be representative of the various governmental and other agencies involved. In addition to members of the food control services the board or committee may include representatives of the Ministries of Health, Agriculture, Industry, Trade and other national agencies involved in standards and food quality control activities. It may also include members from industry, from consumers groups and the academic community, whose activities warrant representation at this high level. Normally such a body should have the authority to set up sub-groups or committee as may be required and to coopt other specialists as and when necessary.

Experience has shown that such an advisory or coordinating body should not be too large or it becomes unwieldy; it should not be too small for it will then not be representative. Often ten or fifteen members are considered adequate but the size and general composition will of course depend upon national needs.

To enable such a body to function properly, adequate arrangements will be necessary to service it through a well qualified technical/juridical secretary supplemented with adequate secretarial staff and other facilities.

The secretary should be a senior officer from the national food control service who could then initiate, or take appropriate action on the general advice of the board or committee or advise the competent authority.

## B. INSPECTION AND SAMPLING OF FOODS

### The Food Inspector

An effective food control infrastructure must provide for sampling foods and inspecting the premises where they are prepared, packed, stored or held for sale. Most of this work is assigned to inspectors, though in some circumstances it would be advantageous that he be accompanied by an analyst, particularly if the inspection requires the expert knowledge of a chemist or microbiologist. This however should only happen in exceptional cases. The inspector should be well trained and impartial. His integrity should be above reproach, for if corruption gains a foothold in the inspection service it will not only undermine the service but will bring considerable harm to the national economy.

The inspector occupies a key position in the food control service. He is the eyes and ears of his agency and must be able to recognize, collect and transmit evidence when a violation has occurred. He collects samples for routine or for special analysis. He should be trained to detect many forms of decomposition or unfitness in foods by sight, odour and possibly taste. He should be trained to inspect various types of food establishments for compliance with sanitary requirements and hygienic practices. He cooperates with other food officials at the local levels. He instructs food packers and handlers in hygienic practices and good manufacturing practices, and encourages voluntary compliance. He investigates the complaints of consumers about the safety or unfitness of foods and any other reports concerning possible violations of the food law. He often participates in consumer education. If reliable inspectors, capable of doing all these things, are to be recruited and retained, they must be paid salaries and be given recognition commensurate with their responsibilities and special training.

Inspectors should be provided with sampling and inspectional equipment and with transportation facilities. In many developing countries the work of food inspectors is greatly hampered by lack of transportation.

### Combined Duties

Sometimes food inspection is combined with other duties. For example, some countries combine food and drug inspection; sometimes public health inspectors may also handle food inspection; in some other nations, the duties of the food inspector may include protection against frauds in commodities other than foods. Such arrangements often prove unsatisfactory

both to the inspector and to the service. Even where conditions make such combinations of duties necessary, the inspectorial staff must include a corps of highly trained food inspection specialists to conduct the more complicated inspections and to train the other inspectors. Training of such dual purpose inspectors become all the more essential. Furthermore, care should be exercised to make sure that food inspection is given appropriate priority and is not neglected.

To provide suitable incentive to the inspectorial staff, consideration should be given to the creation of a cadre of inspectors at a senior level. All inspectors can then be given the opportunity to advance through further education and training, and as they become more competent could receive better salaries and higher status.

#### Inspectors' Manual

A few food control organizations have developed manuals which provide the inspector with the latest information on all aspects of his work. A manual of this kind helps with the uniform application of legal procedures, a correct administrative approach, uniformity in sampling techniques and inspection procedures, and more complete coverage during inspections. It may be possible for developing nations, or those setting up food control services for the first time, to take advantage of the work already done by using any available manuals as a basis for their own productions which must be adapted to their particular needs and be within the framework of their own legal and administrative systems.

The manual may be divided into two parts, one dealing with general food sampling and inspection matters; the second dealing with specific foods. For example at least one manual deals in the first section with such matters as: detailed instructions for general sampling procedures - the conduct to be followed in relationship with dealers - the identification of sampled goods so that the sampled lot can later be recognized if seizure is necessary - when it is necessary to obtain the concurrence of management - the different techniques to be used in sampling various types of foods - how to collect samples from in-transit lots in vehicles, or on board ships - aseptic sampling techniques - how to select lots most likely to be in violation or which will be representative of a consignment - how to identify, seal and transmit samples to ensure their integrity - how to fumigate samples to prevent further multiplication of insects or growth of mould.

It has been found advisable to provide the section dealing with sampling, or an abbreviated form of it, to officials who may be called upon to collect food samples, as for instance customs officials, state or other agencies.

The first section also may provide for general guidance in the inspection of food establishments.

The commodities sections may be divided into sub-sections each relating to a particular type of food, its production, composition, manufacturing processes and the special hazards to which the food is exposed during each of these procedures. By turning to the sub-section dealing with any type of food, the inspector can secure the information he may need while making his inspection of that particular type of food establishment. For example, if he turns to "Beverages", he will find such critical points to watch for in the bottle cleaning procedures - sanitation problems in the receipt, storage and handling of raw materials - particular things to look for in the bottling area, such as care exercised by the firm in the inspection of bottles before and after filling - labelling details.

This manual should preferably be in loose leaf form to permit ease in updating.

While such manuals can improve the quality of food inspections they should not be taken as a substitute for training; only a trained inspector can be expected to effectively use the required techniques and understand some of the involved procedures. Such a manual is not meant to be slavishly followed in a police-type manner during inspections and it is not intended to be a substitute for the exercise of good judgement especially in human contacts.

## C. A FOOD ANALYTICAL SERVICE

### An Analytical Service is Essential

Adequate laboratory facilities staffed with analytical chemists, microbiologists, technicians and support personnel are essential to an effective food control infrastructure. Frequently, violations suspected by an inspector can be verified only through laboratory examination of food samples. Intelligent inspection with selective sampling, followed by accurate analysis and appropriate administrative or legal action provides the most complete approach to consumer protection.

The mutual interest which exists in the work of analysts and inspectors should be stimulated to promote closer cooperation and increased effectiveness in their efforts to provide better consumer protection. When an analyst accompanies an inspector he may, through his knowledge and training, be able to contribute to the making of a better inspection. This kind of activity should however be exercised occasionally. Simultaneously he becomes acquainted with food processing techniques and existing hygienic conditions. Dialogue with trade and industry personnel responsible for quality control can also be beneficial to these and to the food control service.

By visiting the laboratory occasionally the inspector may gain a better understanding of how his sampling operations fit into the overall programme, and why certain procedures must be followed to ensure the identity and integrity of samples. These contacts promote mutual understanding and closer cooperation. The inspector should get information about the results of laboratory investigations of "his" samples.

### Planning for Laboratory Services

Because analytical services are costly, and available funds are usually limited, careful planning is necessary to ensure the best possible service the nation can provide. There is often a tendency for countries setting up food control services to strive immediately for an over ambitious laboratory, equipped with the most modern and sophisticated apparatus, and fully staffed with skilled scientists. While this is a worthy goal, it is seldom attainable during a short time particularly in many developing countries with constraints due to financial and human limitations. This should not deter them, however, from making a start with whatever resources are available. These efforts should be used to provide and maintain the best analytical service the nation can afford.

To provide new or additional laboratory facilities it would be useful to make a start with an inventory of all national laboratory facilities. It is sometimes possible to arrange for the use of parts of existing laboratories operated by public health, agriculture, customs or other agencies. Buildings may be available with adequate supplies of water, electricity and other public services which could be utilized by installing small movable bench units. Further units could be added as funds become available or the work load increases.

In many countries there is a great scarcity of highly trained analytical chemists, microbiologists and other food scientists. Those available must be used where the need is greatest. This may make it possible in the beginning to fully staff laboratories with expert analysts. Persons with less training but able to operate efficiently under professional guidance may be utilized to work under the direction of a skilled analyst who may have to divide his time between the food laboratory and other work. Every effort should be made, though, to obtain a full complement of qualified analysts as quickly as circumstances permit.

The experience gained in operating even such limited facilities may prove helpful when planning to build and equip new laboratories.

#### Location and Design of Laboratories

Before a new laboratory is built, its location should be carefully considered. It should be convenient to inspectors and the administrative staff. The concentration of population and industries should be taken into account. It should preferably be in an area near where many samples are likely to be collected. For example, some countries import most of their foods; they should locate their laboratories at the principal ports of entry. The availability of transportation facilities is important. The laboratory should be placed in a suitable environment where industrial fumes, insanitary surroundings or other conditions will not invalidate analytical results.

The design, layout and equipping of modern laboratories is becoming increasingly complex, requiring the combined skill of architects, mechanical engineers and persons with long experience and vast knowledge about analytical equipment and its use. The guidance of such experts should be sought very early in the planning stage. The laboratory should of course be planned to meet the needs of the staff, and to permit later expansion.

Plans should provide for adequate library facilities, with modern analytical texts, periodicals, and reference services. Some texts are listed in the bibliography. Other books contained in the bibliography provide guidance in ordering chemicals, equipment, glassware and other supplies. These things should be ordered well in advance because of long delays in delivery.

If complicated modern analytical equipment is to be installed, at least one staff member should receive intensive training in its installation, maintenance and repair. Replacement parts should be kept on hand. All too frequently such equipment is found out of use because no one is available to make necessary repairs or adjustments.

#### Uniform Analytical Methods

Even the best trained analysts need to follow uniform procedures and methods when analyzing foods. Food standards often prescribe the method to be used, either by incorporating the exact analytical procedure in the standard, or by reference to stated methods in some reference work. Frequently, analytical methods are specified in food additive or pesticide regulations.

Food manufacturers often have their own quality control services including analytical laboratories. The methods used in their quality control should, as far as possible, be the same as those used by government analysts. This becomes especially important when the government reports that a specified lot of food has been found in violation of the laws and the manufacturer wishes to have check analysis made.

However, as there are: 1) quick screening methods; 2) accurate reference methods, the laboratory must have freedom to do the first investigation in the most economical way. If quick screening methods indicate a violation may exist, further analysis using more time-consuming reference methods may be needed.

#### Laboratory Procedures Manual

The analytical service may find it advisable to develop a Laboratory Procedures Manual. This should contain specific directions on how samples are to be handled to ensure their identity and integrity, and other procedures to be followed in the laboratory. When methods of analysis are not specified elsewhere, the methods may be included in the manual. The manual should preferably be in loose-leaf form to permit its being kept up to date.

#### D. RECRUITMENT AND TRAINING

Recruitment and training are primarily the responsibility of the administration at both levels but inspectors and analysts can often be used to advantage in both activities. In fact, an enthusiastic inspector or analyst may be a most effective recruiting agent. Trained analysts and inspectors should always be used to train others.

Food inspectors should have sound education in subjects related to food control such as food science and technology, sanitary engineering, food microbiology, veterinary science or other related subjects. It is seldom possible to employ many such highly educated inspectors in developing countries. If they accept appointment as inspectors they are likely to move on quickly to other fields of employment which offer more prestige, higher salaries or the chance for more rapid advancement. Therefore some developing countries have adopted a policy of recruiting graduates of secondary schools or technical colleges and training them as inspectors. They may be given on-the-job training in subjects such as food law and regulations, food standards, food labelling and sampling techniques. They may also be given intensive short courses at university level in subjects such as food technology, food hygiene and sanitation, control of food additives and pesticides, and the sources and effects of microbiological contamination. Often they must be sent abroad for such courses. The efficiency and the integrity of the food inspection service will depend on the qualifications and training of food inspectors - and, of course, on the terms of their employment.

On-the-job training may be supplemented by seminars, workshops and demonstrations. All experienced inspectors should be expected to train the less experienced. Microbiologists on the analytical staff can demonstrate such techniques as how to collect aseptic samples and properly protect them during delivery to the laboratory.

Analytical chemists and microbiologists should hold university degrees and preferably have had further post graduate training in the complex specialized analytical procedures for food analysis. Analysts should be sent to universities or other laboratories, when possible, to learn new methods or improve and standardize their techniques. Those having such training will always be expected to train other analysts and also participate in the training of laboratory technicians.

As with inspectors, analysts must receive pay, professional recognition and opportunities for advancement commensurate with their training and responsibilities if they are to be retained in the food control services.

## CHAPTER VII

### EDUCATION AND PUBLIC PARTICIPATION

#### Effective food control depends upon community support

Experience has shown that food control programmes are most effective when actively supported by consumers and the general public. Major improvements in food handling and hygiene can be achieved only by training workers and cleaning up the general environment in which food is prepared or handled. To achieve lasting benefits, it may be necessary to change attitudes and habits of the entire community. It is very hard to maintain a high level of hygiene at plants in filthy surroundings. Food handlers and other workers tend to revert to the practices of those about them. The sanitation in establishments handling foods will be affected by what consumers expect and demand. Often community support is needed to obtain pure and adequate water supplies to improve sanitation and hygienic practices.

One of the chief reasons for food laws and control programmes is to protect consumers against food-borne diseases due to contaminated foods. This purpose will not be achieved solely by passing a law, setting up a control organization and promulgating regulations. Food management as well as handlers must be taught how to prevent contamination and why they should do so. To be fully successful in protecting foods against contamination this educational process must be extended to the individuals who cook and prepare foods in the home.

The effective use and conservation of available food supplies are essential in a world where one third to one half of the people are hungry or malnourished. Health protection of consumers as well as tremendous savings of food could be achieved if handlers and consumers were taught how to protect foods against insects, rodents, moulds and other microorganisms which can cause spoilage or food-borne illnesses. Such teaching, when combined with the education of consumers to make better use of available foods, could improve nutrition as well as health. The responsibility for such education and training should be shared by organizations such as schools, technical institutes, colleges and universities, teacher training institutes, health education agencies, agricultural extension services, consumer groups, and other private and government agencies. Nevertheless, food control officials must often take the lead in promoting and planning for education in hygiene and food protection. Such a programme fits in the objectives set for the Second Development Decade of the United Nations. The General Assembly took note of the need for better educational programmes to raise the levels of health and sanitation and to increase nutritional intake in developing nations. Carrying out of such educational programmes is difficult, but essential if the goals are to be reached.

#### Training Food Handlers

Often the training of food handlers has been given too little attention in developed as well as developing countries. In only a few countries have legislators included training requirements in their food laws or regulations. The food law of July 1967 in Iran specifies that those technically responsible for factories manufacturing foodstuffs must have certain technical training plus experience. Yugoslavia requires that all persons engaged in the manufacture or sale of foods who come into direct contact with food must take courses in personal hygiene and food hygiene. At the end of such a course, oral examinations are given and those who pass are awarded certificates. Korea requires that restaurants and mass feeding centres have licensed cooks who have completed courses in designated training agencies. Cooks are motivated to practice what they have learned, for the licence may be cancelled 'When a cook has caused food poisoning in the performance of cooking'.

Outbreaks of food poisoning have most often been found to be the result of ignorance sometimes extending throughout the organization from management to those who serve the food. Obviously improvement in food handling practices can be achieved only when management and employees are taught how to do their jobs. Normally, it is advisable to give highest priority to the training of those in managerial or supervisory positions. In the first place, their work covers a wider range of activities, so improvements resulting from their better understanding of hygienic practices are likely to be more widespread. Secondly, once they recognize the need for overall improvement they are more likely to be willing to arrange for their employees to attend training sessions during duty hours or on paid time. It is unrealistic to expect employees to voluntarily attend training sessions on their own time, particularly if they do not understand the need for such training.

Courses for food handlers should be rather simple to be understood by persons with limited formal education. The time spent in lecturing should be relatively short and should be interspersed with frequent use of illustrative materials such as slides, flip charts, films, demonstrations or exhibits. The material should be geared to the trainees of the lowest educational levels, and should be practical and basic rather than theoretical. With illustrations and simple explanations the trainees can be given some understanding of such things as what bacteria are; how they cause disease or food spoilage; how foods become contaminated; and conditions likely to lead to spoilage and food poisoning. Cartoons and a bit of humour can help hold attention and get across some points. Most important of all, the trainees must be shown, through illustrations and actual demonstrations precisely what actions they must take and what procedures they will be required to follow to prevent food contamination and spoilage.

Placards or posters are useful particularly to remind food handlers to wash their hands properly clean and sterilize equipment, avoid contact with food when they have open sores, and similar things.

Booklets showing how food should be handled, prepared or stored can be helpful in training employees. Booklets may be very simple for teaching basic hygienic practices, or may provide more scientific information needed at a higher level of management. For example, the Milk Department in the Ministry of Health and Assistance in Mexico has prepared a booklet 'How to Combat Mastitis' intended for dairy owners and operators. This combines excellent colour photographs with carefully prepared text explaining what mastitis is, how it is caused, symptoms, frequency, damage done (including many losses), how it is transmitted, how to treat it, and finally all the steps needed to prevent it, including hygienic practices to be followed in milking. Teaching aids are most likely to achieve their purpose if they include some motivation. For example, the booklet described above has on its cover a cartoon of a cow handling currency, with a blurb saying 'Now I give more milk of better quality and for a longer time thanks to my owner having cured me of mastitis'.

Seminars and workshops are sometimes used for training both supervisory personnel and food handlers. In these, experts from other governments, from international agencies such as FAO and WHO, and from trade associations are sometimes used. For example, a workshop in Latin America to train cannery retort operators relied heavily upon experts from the Food and Drug Administration and the National Canners Association of the United States.

FAO, WHO, PAHO and other international organizations often provide both experts and financial aid for training schools and seminars for food handlers.

#### Priorities should be established

Any nation which is beginning an educational programme for food handlers should recognize that not all can be trained immediately. Priorities should be established. The need to train managerial and supervisory personnel first and in greater depth has been discussed. In choosing which segment of industry is to be trained, highest priority should be given to those people who spend much time in the handling of foods most likely to be contaminated in ways which can produce illness.

For example a very high priority should be given to the training of pressure retort operators in canneries packing low-acid foods, since failure to properly process such foods is likely to result in deaths from botulinus poison. A high priority should be given to producers and handlers of crops such as groundnuts so the development of aflatoxin will be kept to the lowest possible level. The training of persons handling foods likely to cause food-borne illnesses such as salmonellosis should receive high priority. Persons preparing foods in the home need to be taught how to minimize the chances of food-borne illnesses.

The training of workers in slaughter houses and meat packing plants is also very important because of the perishability of the products as well as health hazards involved. The same applies to handlers of fish and other seafoods. Likewise, in planning for booklets, highest priority should be given to those for foods which are most susceptible to hazardous contamination and spoilage.

Educational projects sometimes fail because they try to teach too many things too quickly. A well planned programme concentrating on one aspect of food handling or hygiene utilizing carefully selected visual aids is more likely to be understood and accepted by people of limited formal education, than is one involving a multiplicity of new ideas or mass of unrelated subject matter which may be more confusing than helpful. These considerations emphasize the need for priorities.

It should also be recognized that learning must start with familiar ideas and subjects, upon which base new learning can be built. This, may also affect priorities.

#### Consumer education

The benefits derived from a food control service will depend to a large extent upon the degree of consumer participation and support. Pressure from consumers is often needed to persuade legislators to enact food laws. Food laws, food standards and other regulations are likely to be better fitted to consumer protection if consumers have taken an active part in their elaboration. Well informed and interested consumers can do much to ensure the financial and moral support needed for the effective administration of food laws. Consumers who understand what the law requires are likely to insist on food handlers and dealers complying with requirements. For effective participation in food control programmes consumers need to be educated and organized. Consumer education, therefore, should be considered as an important function of food control organizations and inspection services.

Consumer education, even in developed countries, received little attention until the rise of the consumer movement after 1950. Even where consumer education has been made compulsory in the public schools, there is a scarcity of qualified teachers and curricula are still in the process of development. Trustworthy information about food values and nutrition is needed in the most affluent nations where less than a fourth of the family income is spent on food; it is essential in developing nations where over half of the worker's wage must be spent on food.

Developing countries face difficult problems in trying to reach consumers with educational programmes. Use of mass media may not always be practical because of rural population, low literacy rates, multiple languages, and the low level of ownership of radio and television receivers. It is difficult to arouse interest among those who are apathetic because of malnutrition or who feel that there is no hope of improving the conditions under which they live. Often these persons have almost no understanding of what constitutes good nutrition or hygiene. Innovative approaches are needed to communicate with these people. Even these efforts are not likely to succeed if imposed upon the people by outsiders. In the beginning it may be best to work through established village or tribal leaders or through cooperatives, unions or similar local organizations. Such leaders, even when they are illiterate, may be more effective than trained specialists who are not so well acquainted with local attitudes and practices or who cannot inspire the trust of the people.

Face-to-face teaching of individuals or small groups has been found to be the most effective way to change opinions, attitudes and health habits.

Mass media, when they can reach the appropriate audience, can inform, dispel rumours, counter hostile propaganda, and may help to create a more favourable social climate. Use of mass media is essential when emergencies make it necessary to warn consumers about certain polluted or contaminated foods.

#### Who should do the teaching?

Plans for an effective food control and inspection service should include provisions for trained personnel to teach food hygiene and related subjects to food handlers and consumers. Unfortunately, persons capable of doing this effectively are in short supply. Public health inspectors, sanitary engineers and sanitarians usually have the necessary background of training and experience in food hygiene and related subjects; they may lack training in educational techniques and methods and this aspect should therefore form part of their training. Extension agents and local teachers may lack training in hygiene and environmental health. These may, and to the extent possible, should be given any training needed to enable them to teach food sanitation and related subjects to food handlers and the general public. This is particularly important because of their chances to conduct face-to-face teaching in their many contacts with people. These contacts can be made more productive from the educational point of view if the workers are conscious of this responsibility and equipped with necessary knowledge and skills.

For example, there has been too little emphasis on the educational aspects of food plant inspection. The inspector has an excellent opportunity, whenever he observes bad hygienic conditions or unsatisfactory practices, to explain to both management and food handlers why these should be corrected. To the extent that his time and training will permit, he must provide guidance about how to correct these. More stress on the educational aspects of inspections may, in the long run, provide increased consumer protection and at the same time improve the image of the inspector who all too often is pictured as a policeman rather than a teacher and guide. The fact that the inspector has regulatory power will help stimulate the learning and practice of hygiene.

Everything possible should be done to make the best use of those trained persons who are available. For example, the Instituto de Nutrición de Centro América y Panamá (INCAP) has developed some ingenious methods for teaching nutrition and hygiene to uneducated persons while using a minimum number of highly trained persons. They have developed a course in food hygiene which combines slides and cassette recordings. The first slide showing a person in a hospital bed and a plate of food is accompanied by a recorded explanation that the person got sick from eating contaminated food. Then through a progression of slides and explanations, information is imparted about bacteria, how they grow, how foods become contaminated, the conditions which cause rapid multiplication of bacteria, and how to handle food to prevent contamination and bacterial spoilage and development of toxins. Between explanations the recording includes music during the period for changing slides. The equipment is suited for use wherever electricity is available. With batteries it can be used in villages where there is no electric power. Any person trained in operating the slide projector and cassette player can present the programme. When possible, however, there should be a trained person present to answer questions and lead in any discussion.

#### The role of consumer organizations

Since the rise of "consumerism" consumer organizations have demonstrated their power and influence in the field of food law and regulations. Though these organizations began in the developed nations, they are rapidly growing in numbers and power in many developing areas. Through the International Organization of Consumers' Unions they are making their influence felt at the international level.

The purposes of consumer groups vary. Some analyse and test consumer products and publish the results to guide their members. Some make market surveys to inform their members of the best buys and help them avoid merchants who follow such unethical practices as false advertising. Some promote the enactment and enforcement of consumer legislation, including food laws and regulations. Many handle complaints, often first taking these up with the merchants or manufacturers involved, then referring them to the government agency if adjustments are not made. Others, such as the American Council on Consumer Interests are primarily concerned with research and training in the field of consumer education. Some do several or all of these things.

All of these activities were included in the subjects discussed and the recommendations made by the recent Seminar on Community Education for Consumer Protection held in Singapore 4-8 February 1974. This Seminar was sponsored by the IOCU, Unesco, and the United Nations Economic Commission for Asia and the Far East in cooperation with the Consumers Association of Singapore. Seminar recommendations included such subjects as: guidelines on legislation relating to food adulteration, implementation by national governments of Codex food standards, improvement of food additive regulations, better laws concerning weights and measures with more vigilant enforcement, guidelines and training centres for use of audio-visual methods of consumer education, adult education programmes, pilot studies on consumer education for opinion leaders, teacher training programmes, and inclusion of national consumer organization representatives in committees dealing with food standards.

Consumers, individually and through their organizations, can be powerful allies of government officials seeking to modernize food laws, harmonize food standards and upgrade inspection services. They can do much to discourage food adulteration and fraudulent practices. Their help can be invaluable in connection with community education for improved sanitation, better nutrition and improved general health. Such help should be encouraged and utilized to the fullest extent.

Consumers should be made aware of their rights, privileges and responsibilities under the food law. They should be encouraged to advise food control officials whenever they notice insanitary conditions or unhygienic practices in food establishments, or when they encounter contaminated, adulterated, spoiled or mislabeled foods. They cannot do this if they do not know how and to whom to report these things. They will not continue to report unless their complaints are investigated and acted upon. Food control officials should, therefore, inform complainants about any action taken. Food control officials should see that consumers are provided with information about how, where and to whom complaints may be made. Consumer organizations can, and often do, help to disseminate such information and may assist consumers in making complaints known to the appropriate officials.

## CHAPTER VIII

### ROLE OF INTERNATIONAL ORGANIZATIONS

#### Why Assistance is Requested

Why do countries frequently lack effective food control programmes? Though there may be many explanations, the basic problems involve:

- the priority assigned to such programmes in national planning, which depends in part upon the extent of knowledge concerning the role of food control in consumer protection and the national economy
- lack of financial resources
- motivation from consumers, industry and government.

Once a strong motivation exists, the other obstacles can be overcome in one way or another, sometimes with outside assistance. The major effort must always be made by the nation, with the optimum utilization of its own resources, but even the minimum of outside help may sometimes greatly stimulate progress towards the development of food control services.

#### Guidance in Establishing Food Control Programmes

Once a nation has decided to start a new food control programme or expand an existing one, it needs to go through a stage of careful planning. This would involve an assessment of facilities and resources locally available and an estimation of any need for outside guidance and assistance.

Information about particular aspects of food control may be found in the bibliography. Both FAO and WHO have as part of regular programme activities the providing of guidance in particular matters relating to food control, consumer protection and food safety. To the extent that their facilities and other obligations permit, they provide experts upon request to survey existing conditions and to make specific recommendations concerning what a nation should do to modernize its laws and regulations or to improve its inspection and laboratory services.

Before such surveys are undertaken the scope and terms of reference must be agreed upon. The study may be general or may be confined to some one aspect such as law, laboratories, or training of analysts.

Unless a nation is prepared to act upon the recommendations of the experts, such studies can result in waste of money and manpower.

#### Expertise Available Through FAO and WHO

Chapter V includes discussions about the expertise needed to elaborate food standards, to develop codes of hygienic practice and microbiological standards, to do the safety testing and evaluation of data essential to the establishment of safe conditions of use for food additives, to set tolerances for pesticide residues, and to develop satisfactory methods of chemical and microbiological analysis. Individual developing countries may not always have either the experts or the laboratory facilities needed for these activities. Such countries can draw upon the information and data accumulated and evaluated by Expert Committees of FAO, IAEA, WHO and by the Codex Alimentarius Commission and its subsidiary bodies. Any country can adopt the recommended food standards, codes of hygienic practice, food additive controls, or pesticide residue tolerances; or they can adapt these or other recommendations of international bodies to their special needs.

Appendices II to X inclusive contain lists of recommended food standards, codes of practice and certain other recommendations concerning food additives, pesticides and irradiated foods. Information about the activities of the FAO/WHO Codex Alimentarius Commission may be found in Appendix XI.

#### Other Organizations Involved in Elaboration of Food Standards

Although the Codex Alimentarius Commission is pre-eminent in the field of food standards elaboration at the international level, other international bodies are involved to a limited extent. The International Standards Organization (ISO) and the International Commission on Microbiological Specifications for Foods (ICMSF) work closely with the Codex Commission. The United Nations Industrial Development Organization (UNIDO) concerns itself with development of food industries to enable them to produce foods conforming to standards. The General Agreement on Tariffs and Trade (GATT) sometimes issues standards intended to facilitate international trade. The work of these and other organizations needs to be properly coordinated with that of the Codex Alimentarius Commission to avoid duplication of effort and to ensure international harmonization of standards.

#### Providing Trained Analysts, Inspectors and Other Experts

Well trained analysts, inspectors and administrative officers are essential to the success of any food control programme. Some developing countries may have neither the trained personnel nor facilities to teach them. This is most likely to be the case in nations trying for the first time to build food control organization and inspection services. It has often been found that assistance from outside can stimulate the development of the infrastructure for food control.

Both FAO and WHO have extensive assistance programmes. They may arrange for temporary assignment of outside experts and consultants to work with and train counterpart officials from the national government. These experts may be provided for a period of months or over several years. They may be given only limited assignments; for example, an expert in the maintenance and repair of sophisticated laboratory apparatus was provided to train laboratory personnel in how to put this equipment in working order and then maintain it. Case histories of much broader programmes are discussed later in this Chapter.

#### Providing Training and Scholarships

Both FAO and WHO have extensive programmes to help developing countries train analysts and inspectors. Such training may be provided through individual fellowships, by organizing training seminars and workshops and, in some cases, through the setting up of training centres on a comparatively long term basis.

Financing of such training activities may often be done by FAO and WHO on their own or through other funding arrangements. Individual governments sometimes pay for such training.

It is often found that personnel after the completion of their training are not given assignments for which they have been trained. This is a colossal waste of both human and financial resources. Countries which accept scholarships or other training aid should recognize their obligation to use their trained inspectors and analysts in accordance with the purpose for which the scholarship was granted. Also appropriate recognition needs to be given to the trained expert in terms of salary, prestige and possibly other benefits such as provision for housing suitable to his status, transportation to facilitate his performance of duties, etc.

#### Requests for Assistance

Before requesting technical assistance it is very important for the country to make provision for the programme in its overall national development plan. Discussions with the representatives of UNDP, FAO and WHO may be found useful in this connection. Requests for technical assistance may be directed to the headquarters of FAO in Rome or of WHO in Geneva or their Regional Offices, but preferably they should be directed to the FAO Country or Area Representative or the WHO Office in the country making the request.

An application for assistance should be carefully prepared. It should clearly indicate the background of the country's economy, including its food and agricultural resources, the state of health and nutrition of the population and the status of existing food control services. It should also clearly indicate the benefits to be derived from the proposed activity, and should include a definite plan of action with an estimation of the external resources required and the national counterpart contribution. The requesting country should not only support the project to the extent of its financial ability, but should demonstrate its determination and ability to carry on once the initial phase is completed and outside aid is discontinued. National involvement is essential and the benefits derived will be directly related to the degree of involvement of the recipient government. A country which is already doing all that it can to support an active food control programme is more likely to receive assistance than is one which has done nothing.

FAO, WHO and UNDP receive many requests for technical assistance in the field of food control. Each must be considered not only on its own merits but in comparison to requests received in other fields and from other nations. If either FAO or WHO decides that assistance should be provided, the agency considers funding possibilities. Funds may also come from international agencies, such as the United Nations Development Programme (UNDP), from national "Funds-in-Trust" or from other sources. Three illustrations of how technical assistance has been provided may be found in Appendix XII, pages 107 to 109.

APPENDIX I

This is an example of a possible structure of a food law. Since different countries place responsibility for food control with different Ministries or agencies, the draft has been prepared in a general way so that it can be adapted to local conditions. In the draft law responsibility for preparation of regulations and overall enforcement of the act is with the Central Government, but reliance is placed upon local authorities for most enforcement within local authority boundaries. If a country wishes to retain all authority at the national level, those provisions concerning local authorities can be removed. In any case all authority for preparation of all regulations, and for general direction of the food control programme should be retained at the national level to avoid creation of divergent regulations and rules at the local, provincial or state level. This model food law has been developed by the FAO/WHO Food Standards Programme and is based on a number of food laws currently in force in developed and developing countries. It has been reviewed and endorsed by Joint FAO/WHO meetings of countries of the Africa and Asia regions.

THE FOOD ACT

ARRANGEMENT OF SECTIONS

PART I

PRELIMINARY

Section

1. Short title and commencement
2. Interpretation

PART II

GENERAL PROVISIONS

3. Prohibition against sale of poisonous, unwholesome or adulterated food
4. Deception
5. Standards of foods
6. Prohibition against sale of food not of the nature, substance or quality demanded
7. Sale and preparation of food under insanitary conditions

PART III

IMPORTATION AND WARRANTY

8. Importation
9. Warranty
10. Defences

PART IV

REGULATIONS RELATING TO FOOD STANDARDS, FOOD SAFETY  
AND OTHER MATTERS.

11. Regulations

PART V

ADMINISTRATION AND ENFORCEMENT

12. Food Standards Board
13. Powers of authorized officers
14. Appointment and duties of authorized officers for official laboratories
15. Other authorized officers
16. Power of Minister to obtain particulars of certain food ingredients

PART VI

LEGAL PROCEDURES

17. Power of court to order licence to be cancelled and articles to be disposed of
18. Prosecution
19. Penalties
20. Certificates of analysis and presumptions
21. Saving of other written laws

ACT

Date of Assent: \_\_\_\_\_

An Act to protect the public against health hazards and fraud in the sale and use of food, and for matters incidental thereto or connected therewith.

\*

ENACTED by \_\_\_\_\_

Enactment

PART I

PRELIMINARY

1. This Act may be cited as the Food Act, and shall come into operation on such date as the Minister may, by statutory order, appoint. Short title and commencement

2. In this Act, unless the context otherwise requires -  
"advertisement" includes any representation by any means whatsoever for the purpose of promoting directly or indirectly the sale or disposal of any food;  
"article" includes -

(a) any food and any labelling or advertising materials in respect thereof; or  
(b) anything used for the preparation, preservation, packing or storing of any food;

"authorized officer" means any suitably qualified person authorized in writing by the Minister or by a local authority with the approval of the Minister for the purpose of this Act, and - (a) for the purpose of taking of samples under sections twelve and fourteen and sending them to an official laboratory and for receiving reports thereof under section thirteen includes a police officer of or above the rank of Assistant Inspector and an officer of the Department of Customs and Excise authorized in that behalf by the Controller of Customs and Excise;

"Board" means the Food Board established by section twelve;  
"food" includes any article manufactured, sold or represented for use as food or drink for human consumption, chewing substances and any ingredient of such food, drink or chewing substances;

"insanitary conditions" means such conditions or circumstances as might cause contamination of a food, with dirt or filth or might render the same injurious or dangerous to health;

"label" includes any tag, brand, mark, pictorial or other descriptive matter, written, printed, stencilled, marked, embossed or impressed on, or attached to or included in, belonging to, or accompanying any food;

"local authority" means -  
(a) a municipal council; or  
(b) a township council; or  
(c) a rural council;

\* Date on which the Act shall come into operation

“official laboratory” means a laboratory operated by authorized officers under this Act, and designated by the Minister, or by a local authority with the approval of the Minister, to act as an official laboratory for the purpose of this Act;

“package” includes anything in which any food is wholly or partly placed or packed and includes any basket, pail, tray or receptacle of any kind whether open or closed;

“premises” includes -

(a) any building or tent or other structures permanent or otherwise together with the land on which the same is situated and any adjoining land used in connection therewith and includes any vehicle, conveyance or vessel; and  
(b) for the purpose of section twelve, a reference to premises shall be deemed to include reference to any street, open space or place of public resort, bicycle or other vehicle used for the preparation, preservation, packaging, storage or conveyance of any article;

“preparation” includes manufacture, processing and any form of treatment, and ““prepare” shall be construed accordingly;

“sell” includes offer, advertise, keep, expose, transmit, convey, deliver or prepare for sale or exchange, dispose of for any consideration whatsoever, or transmit, convey or deliver in pursuance of a sale, exchange, or disposal, as aforesaid;

“ship” includes any boat or craft;

### PART III

#### GENERAL PROVISIONS

##### A. Food

3. Any person who prepares or sells any food that  
(a) has in or upon it any substance which is poisonous, harmful or otherwise injurious to health; or  
(b) consists in whole or in part of any filthy, putrid, rotten decomposed or diseased substance or foreign matter, or otherwise unfit for human consumption; or  
(c) is adulterated;  
shall be guilty of an offense.

Prohibition against  
sale of poisonous  
unwholesome or  
adulterated food

4. Any person who labels, packages, prepares, sells or advertises any food in a manner that is false, misleading or deceptive as regards its character, nature, value, substance, quality, composition, merit or safety, or in contravention of any regulations made under this Act, shall be guilty of an offence.

5. Where a standard has been prescribed for any food, any person who labels, packages, prepares, sells or advertises any food which does not comply with, that standard, in such a manner that it is likely to be mistaken for food of the prescribed standard, shall be guilty of an offence.

Standards  
of food

6. Any person who sells to the prejudice of the purchaser any food which is not of the nature, or is not of the substance, or is not of the quality, of the article demanded by the purchaser, shall be guilty of an offence.

Prohibition  
against sale of  
food not of the  
nature, substance  
or quality demanded

7. Any person who sells, prepares, packages or stores for sale any food under insanitary conditions shall be guilty of an offence.

Sale and prep-  
aration of food  
under insanitary  
conditions

### PART III

#### IMPORTATION, WARRANTY & DEFENCES

8. (1) Subject to the provisions of subsection (2), the importation of any article which does not comply with the provisions of this Act is hereby prohibited.

Importation

(2) Where an article sought to be imported into \_\_\_\_\_ would, if sold in \_\_\_\_\_, constitute a contravention of this Act, the article may be imported into \_\_\_\_\_ for the purpose of satisfactorily relabelling or reconditioning the same so that the provisions of this Act are complied with and, where such relabelling or reconditioning is not carried out within three months of the importation, such article shall be exported by the importer within a further period of one month or such other period as the Minister may determine and, where it is not so exported, it shall be forfeited and disposed of as the Minister may direct.

9. (1) No manufacturer or distributor of, or dealer in, any article shall sell such article to any vendor unless he gives a warranty in writing in the prescribed form about the nature and quality of such articles to the vendor specifying that the article may lawfully be sold under the provisions of this Act.

Warranty

(2) If any person contravenes the provisions of subsection (1) or gives a warranty which is false, he shall be guilty of an offence.

10. In any proceedings for an offence under this Act it shall be a defence for the defendant to prove:

Defences

- (a) that he purchased the food from another person who furnished a written warranty in compliance with Section 9 of this Act, and sold the food in the same condition the article was in at the time he purchased it, and
- (b) that he could not with reasonable diligence have ascertained that the sale of the article would be in contravention of this Act or the regulations, and
- (c) that in relation to an offence relating to the publication of an advertisement, he received the advertisement for publication in the ordinary course of business and had no reason to believe that an offence would be committed.

PART IV

REGULATIONS RELATING TO FOOD STANDARDS, FOOD SAFETY AND  
OTHER MATTERS

Regulations 11. (1) The Minister may by regulations provide for standards in relation to food and in particular but without prejudice may make regulations in relation to any of the matters in the next sub-sections:

(2) the Minister may make regulations for:

- (a) declaring that any food or class of food is adulterated if any prescribed substance or class of substance is present therein or has been added thereto or extracted or omitted therefrom;
- (b) respecting -
  - (i) the labelling and packing and the carrying, exposing and advertising for sale of food;
  - (ii) the size, dimensions and other specifications of packages of food;
  - (iii) the sale or the conditions of sale of any food, and
  - (iv) the use of any substance as an ingredient if any food, to prevent the consumer or purchaser thereof from being deceived or misled as to its quality, quantity, character, value, composition, effect, merit or safety or to prevent injury to the health of the consumer or purchaser;
- (c) prescribing standards of composition, strength, potency, purity, quality or other property of any food;
- (d) respecting the importation or exportation of food, in order to ensure compliance with this Act;
- (e) respecting the method of preparation, preserving, packing, storing, conveying and testing of any food, in the interests of, or for the prevention of injury to, the health of the consumer, user or purchaser, and for the observance of adequate standards of hygiene in the carrying out of these activities;
- (f) respecting the carriage of goods subject to the provisions of this Act, including the licensing of vehicles used in such carriage;
- (g) requiring persons who sell food, to maintain such books and records as the Board considers necessary for the proper enforcement and administration of this Act;
- (h) providing for the analysis or examination of food, for the purposes of this Act or for any other purposes and prescribing a tariff of fees to be paid for such analysis and for prescribing methods of analysis;
- (i) providing for the taking of samples of any articles for the purposes of this Act or for any other purpose;
- (j) exempting any food, from all or any of the provisions of this Act and prescribing the conditions of such exemption;
- (k) respecting the licensing of premises where foods are prepared, and of persons preparing such foods; and
- (l) prescribing anything which is to be or which may be prescribed under this Act.

(3) Before making any regulations the Minister shall consult with the Board and with such organizations as appear to him to be representative of interests substantially affected by the regulations, except in cases of urgency he may make regulations without such consultations being made.

(4) It shall be an offence for any person to commit any act in contravention of any provision of a regulation made under this Section.

(5) Where any regulations made under this Act or under any other Act prohibit or restrict the addition of any ingredient or material to any food, the addition of such ingredient or material, if made in contravention of the regulations, shall, for the purpose of this Act, be deemed to render the food injurious to health.

(6) Where any regulations made under this Act or any other Act prescribe the composition of any article of food intended for sale, or prohibit or restrict the addition of any ingredient or material to any such article, the purchaser of such article shall, unless the contrary is proved, be deemed for the purpose of this section to have demanded an article complying with the provisions of the regulations as regards the presence or amount of any constituent, ingredient or material specified in the regulations.

(7) The Minister, after consultation with the Board, may make regulations generally for carrying out any of the purposes or provisions of this Act.

PART V

ADMINISTRATION AND ENFORCEMENT

12. (1) The Minister shall constitute a Board to advise the Minister and to carry out such functions as he may determine.

(2) The Board shall consist of such persons with experience of manufacturing, distributing or consuming food or of the science, technology, administration or commercial matters affecting food and such officials from departments as he may determine.

(3) The Board shall make reports to the Minister from time to time and unless he determines otherwise those reports shall be published.

(4) If the Minister so determines, he may establish groups under the auspices of the Board to deal with particular matters or with aspects of food standards and food safety.

Powers of authorized officer

13. (1) An authorized officer may, at any hour reasonable for the proper performance of his duty -

(a) enter any premises where he believes any articles to which this Act applies is prepared, preserved, packaged, stored or conveyed, examine any such article and take samples thereof, and examine anything that he believes is used, or capable of being used for such preparation, preservation, packaging, storing or conveying;

(b) stop or search or detain any aircraft, ship or vehicle in which he believes on reasonable grounds that any article subject to the provisions of this Act is being conveyed and examine any such article and take samples thereof for the purposes of this Act;

(c) open and examine any receptacle or package which he believes contains any article to which this Act applies;

(d) examine any books, documents or other records found in any premises mentioned in paragraph (a) that he believes contain any information relevant to the enforcement of this Act with respect to any article to which this Act applies and make copies thereof or take extracts therefrom; and

(e) seize and detain for such time as may be necessary any article by means of or in relation to which he believes any provisions of this Act has been contravened.

(2) An authorized officer acting under this section shall, if so required, produce his authority.

(3) Any owner, occupier or person in charge of any premises entered by an authorized officer pursuant to paragraph (a) of subsection (1), or any person found therein, who does not give to the authorized officer all reasonable assistance in his power and furnish him with such information as he may reasonably require, shall be guilty of an offence.

(4) Any person who obstructs or impedes any authorized officer in the course of his duties or prevents or attempts to prevent the execution by the authorized officer of his duty under this Act shall be guilty of an offence.

(5) Any person who knowingly makes any false or misleading statement either verbally or in writing to any authorized officer engaged in carrying out his duties under this Act shall be guilty of an offence.

(6) An authorized officer shall release any article seized by him under this Act when he is satisfied that all the provisions of this Act with respect thereto have been complied with.

(7) Where an authorized officer has seized an article under this Act and the owner thereof or the person in whose possession the article was at the time of seizure consents to the destruction thereof, the article may be destroyed or otherwise disposed of as the authorized officer may direct; if the owner or the person does not consent to the destruction of the article, the authorized officer may apply to a Court for the destruction or disposal of such article and the Court may make such order as it may deem fit.

(8) Where any article has been seized under the provisions of paragraph (a) of subsection (1) and the owner thereof has been convicted of an offence under this Act, the article may be destroyed or otherwise disposed of as the Court may direct.

(9) Any person who removes, alters or interferes in any way with any article seized under this Act without the authority of an authorized officer shall be guilty of an offence.

(10) Any article seized under this Act may at the option of an authorized officer be kept or stored in the premises where it was seized or may at the direction of an authorized officer be removed to any other proper place.

(11) An authorized officer may submit any article seized by him or any sample therefrom or any sample taken by him to an official laboratory for analysis or examination.

Appointment  
and duties of  
authorized  
officers for  
official  
laboratories

14. (1) No person shall be appointed to be an authorized officer for any area in which he is engaged directly or indirectly in any trade or business connected with the sale of food;

(2) An authorized officer designated by the Minister as Director employed in an official laboratory shall as soon as practicable analyse or examine any sample taken in pursuance of this Act and shall give the authorized officer who took the sample a certificate specifying the result of the analysis or examination, and such certificate shall be in such form as may be prescribed by the Minister on the advice of the Board.

Other author-  
ized officers

15. The Minister may, in relation to any matter appearing to him to affect the general interests of the consumer, direct a public officer to procure for analysis samples of any food, and thereupon that officer shall have all the powers of an authorized officer under this Act, and this Act shall apply as if the officer were an authorized officer.

Power of  
Minister to  
obtain parti-  
culars of  
certain food  
ingredients

16. (1) The Minister may direct any person who at the date of the direction or at any subsequent time carries on a business which includes the production, importation or use of any substances to which this Act applies to furnish to him, within such time as may be specified in such direction, such particulars, as may be so specified, of the composition and use of any such substance sold or for sale in the course of that business or used in the preparation of food.

(2) Without prejudice to the generality of subsection (1), a direction made thereunder may require the following particulars to be furnished in respect of any substance, that is to say -

(a) particulars of the composition and chemical formula of the substance;

(b) particulars of the manner in which the substance is used or proposed to be used in the preparation of food;

(c) particulars of any investigations carried out by or to the knowledge of the person carrying on the business in question, for the purpose of determining whether and to what extent the substance, or any product formed when the substance is used as aforesaid, is injurious to, or in any other way affects, health;

(d) particulars of any investigation of enquiries carried out or to the knowledge of the person carrying on the business in question for the purpose of determining the cumulative effect on the health of a person consuming the substance in ordinary quantities.

(3) No particulars furnished in accordance with a direction under this section and no information relating to any individual business obtained by means of such particulars shall, without the previous consent in writing of the person carrying on the business in question, be disclosed except in due discharge of his duties under this Act, and any person who discloses any such particulars or information in contravention of this subsection shall be guilty of an offence.

PART VI

LEGAL PROCEEDINGS

Power of court to order licence to be cancelled and articles to be disposed of

17. (1) On the conviction of any person for any offence under this Act, the court may, in addition to any other penalty which it may lawfully impose, cancel any licence issued to such person under any written law.  
(2) Where a person has been convicted of an offence under this Act, the court may order that any article by means of or in relation to which the offence was committed or anything of a similar nature belonging to or in the possession of the convicted person or found with such article, be forfeited, and upon such order being made such articles and things may be disposed of as the court may direct.

Prosecution

18. (1) Where an official laboratory having analysed or examined any article to which this Act applies, has given its certificate and from that certificate it appears that an offence under this Act has been committed, an authorized officer may take proceedings under this Act before any Subordinate Court having jurisdiction in the place where the article sold was actually delivered to the purchaser or the sample thereof taken.  
(2) In any proceedings under this Act, the contents of any package appearing to be intact and in the original state of packing by the manufacturer thereof, shall be deemed, unless the contrary is proved, to be an article of the description specified on the label.

19. (1) In any prosecution under this Act, the summons shall state the particulars of the offence or offences alleged and also the name of the prosecuting officer and shall not be made returnable before fourteen days from the date on which it is served.  
(2) A person found guilty of an offence under this Act for which no special penalty is provided shall be liable to conviction -  
(a) in the case of a first offence, to a fine not exceeding \_\_\_\_\_ or to imprisonment for a term not exceeding three months, or to both such fine and imprisonment;  
(b) in the case of a subsequent offence, to a fine not exceeding \_\_\_\_\_ \* or to imprisonment for a term not exceeding six months, or to both such fine and imprisonment.  
(3) If a person found guilty of an offence is found to have committed the offence with the intent to defraud or mislead he shall be fined a sum not exceeding \_\_\_\_\_ or imprisonment for a term not exceeding \_\_\_\_\_ or both.

20. In any proceedings under this Act -  
(a) a certificate of analysis purporting to be signed by the director of an official laboratory shall be accepted as prima facie evidence of the facts stated therein provided that -  
(i) the party against whom it is produced may require the attendance of the authorized officer performing the analysis for the purpose of cross-examination; and

\* Here should be inserted the amount.

(ii) no such certificate of an official laboratory shall be received in evidence unless the party intending to produce it has before the trial given the party against whom it is intended to be produced reasonable notice of such intention together with a copy of the certificate.

(b) evidence that the package contains any article to which this Act applies, bore a name, address or registered mark of the person by whom it was manufactured or packed shall be prima facie evidence that such article was manufactured or packed, as the case may be by that person;

(c) any substance commonly used for human consumption, if sold or offered, exposed or kept for sale, shall be presumed, until the contrary is proved, to have been sold or, as the case may be, to have been or to be intended for sale for human consumption;

(d) any substance commonly used for human consumption which is found on premises used for the preparation, storage or sale of that substance and any substance commonly used in the manufacture of products for human consumption which is found on premises used for the preparation, storage or sale of those products, shall be presumed, until the contrary is proved, to be intended for sale, or for manufacturing products for sale, for human consumption;

(e) any substance capable of being used in the composition or preparation of any substance commonly used for human consumption which is found on premises on which that substance is prepared shall, until the contrary is proved, be presumed to be intended for such use.

Saving of  
other written  
laws

21. The provisions of this Act shall be in addition to and not in derogation of the provisions of any other written law.

## APPENDIX II

### POSSIBLE LIST OF FOOD STANDARDS AND REGULATIONS

The power to make regulations should be embodied in the basic food law, i.e. the Act itself. The extent and scope of regulations will be determined by the special needs of the community. The list below will perhaps provide a guide to those developing nations drafting food regulations for the first time. This is not offered as a model and should not be used as such.

#### PART A. ADMINISTRATION - may be concerned with:

- (i) Procedures to be followed in filing petitions for food standards, adoption of international standards and other petitions.
- (ii) Exemptions for certain types of food.
- (iii) Format and handling of warranties or guarantees.
- (iv) Procedures and forms to be used in sampling, detention, release or disposition of imported foods.
- (v) Procedures for collecting, scanning and reporting on food samples.
- (vi) Advisory Committees.
- (vii) Public Hearings.
- (viii) Delegation of Authority.
- (ix) The keeping of official records.
- (x) Public Information.
- (xi) Internal Organization of Staff.
- (xii) Statements of General Policy.
- (xiii) Registration of foods when required, including:
  - (a) Submission of samples;
  - (b) Collection and submission of samples, and by whom;
  - (c) Registration fees and method of payment;
  - (d) Period registration remains valid;
  - (e) Fees for analysis.
- (xiv) Certificates of free sale.
- (xv) Licences.
- (xvi) Export Permits.

#### PART B. FOODS

1. General Provisions are likely to provide for definitions, permits, policy, labelling (including the determination of common names), special dietary provisions, etc.
2. Food Hygiene
3. Food Additives
4. Food Colours
5. Poisonous Substances in Food

6. Vitamins, Minerals and Amino Acids in Foods

7. Food Standards for:

a. Beverages and Beverage Materials:

(1) Alcoholic Beverages

(2) Coffee

(3) Soft drinks

(4) Tea

b. Cocoa Products

c. Dairy Products

(1) Milk

(2) Milk Products

d. Fats and Oils (Including Margarine)

e. Grain and Bakery Products

f. Marine and Fresh Water Animal Products

g. Meat, its Preparation and Products

h. Poultry - Poultry Meat, Preparation and Products

i. Fruits, Vegetables and their Products

j. Food Seasonings and Flavourings

(1) Flavouring Preparation

(2) Salt

(3) Spices, Dressings and Seasonings

k. Sweetening Agents

(1) Sugar and Syrups

(2) Artificial Sweeteners

l. Miscellaneous

(1) Baking Powder

(2) Jelling Agents

(3) Vinegar

m. Foods for Special Dietary Uses

(1) Infant foods

(2) Others

### APPENDIX III

#### RECOMMENDED INTERNATIONAL STANDARDS

#### LIST OF RECOMMENDED INTERNATIONAL STANDARDS ADOPTED BY THE CODEX ALIMENTARIUS COMMISSION

#### LIST A - FIRST SERIES OF 42 STANDARDS SENT TO GOVERNMENTS FOR ACCEPTANCE

##### Labelling

CAC/RS 1-1969 - General Standard for the Labelling of Prepackaged Foods

##### Sugars

CAC/RS 4-1969 - White Sugar

CAC/RS 5-1969 - Powdered Sugar (Icing Sugar)

CAC/RS 6-1969 - Soft Sugars

CAC/RS 7-1969 - Dextrose Anhydrous

CAC/RS 8-1969 - Dextrose Monohydrate

CAC/RS 9-1969 - Glucose Syrup

CAC/RS 10-1969 - Dried Glucose Syrup

CAC/RS 11-1969 - Lactose

CAC/RS 12-1969 - Honey (European Regional Standard)

##### Processed Fruits and Vegetables

CAC/RS 13-1969 - Canned Tomatoes

CAC/RS 14-1969 - Canned Peaches

CAC/RS 15-1969 - Canned Grapefruit

CAC/RS 16-1969 - Canned Green Beans and Wax Beans

CAC/RS 17-1969 - Canned Applesauce

CAC/RS 18-1969 - Canned Sweet Corn

CAC/RS 42-1970 - Canned Pineapple

##### Edible Fats and Oils

CAC/RS 19-1969 - General Standards for Fats and Oils not covered by individual standards

CAC/RS 20-1969 - Edible Soya Bean Oil

CAC/RS 21-1969 - Edible Arachis Oil

CAC/RS 22-1969 - Edible Cottonseed Oil

CAC/RS 23-1969 - Edible Sunflowerseed Oil

CAC/RS 24-1969 - Edible Rapeseed Oil

CAC/RS 25-1969 - Edible Maize Oil

CAC/RS 26-1969 - Edible Sesameseed Oil

CAC/RS 27-1969 - Edible Safflowerseed Oil

CAC/RS 28-1969 - Lard

CAC/RS 29-1969 - Rendered Pork Fat

CAC/RS 30-1969 - Premier Jus

CAC/RS 31-1969 - Edible Tallow

CAC/RS 32-1969 - Margarine

CAC/RS 33-1970 - Olive Oils

CAC/RS 34-1970 - Mustardseed Oil

Pesticide Residues

CAC/RS 2-1969 - Tolerances for Pesticide Residues - 1st series  
CAC/RS 35-1970 - Tolerances for Pesticide Residues - 2nd series

Fish

CAC/RS 3-1969 - Canned Pacific Salmon  
CAC/RS 36-1970 - Quick Frozen Gutted Pacific Salmon  
CAC/RS 37-1970 - Canned Shrimps or Prawns

Edible Fungi

CAC/RS 38-1970 - General Standard for Fungi and Fungus Products  
CAC/RS 39-1970 - Edible Dried Fungi  
CAC/RS 40-1970 - Fresh Fungus 'Chanterelle' (European Regional Standard)

Quick Frozen Fruits and Vegetables

CAC/RS 41-1970 - Quick Frozen Peas

LIST OF RELATED RECOMMENDED INTERNATIONAL METHODS OF ANALYSIS SENT TO GOVERNMENTS

CAC/RM 1/8-1969 - Methods of Analysis for Sugars  
CAC/RM 9/14-1969 - Methods of Analysis for Fats and Oils  
CAC/RM 32/33-1970 - Methods of Analysis for Quick Frozen Fruits and Vegetables  
CAC/RM 36/39-1970 - Methods of Analysis for Processed Fruits and Vegetables

LIST B - SECOND SERIES OF 10 STANDARDS SENT TO GOVERNMENTS FOR ACCEPTANCE EARLY IN 1973

Pesticide Residues

CAC/RS 43-1971 - Tolerances for Pesticide Residues - 3rd Series

Fruit Juices

CAC/RS 44-1971 - Apricot, Peach and Pear Nectars  
CAC/RS 45-1971 - Orange Juice  
CAC/RS 46-1971 - Grapefruit Juice  
CAC/RS 47-1971 - Lemon Juice  
CAC/RS 48-1971 - Apple Juice  
CAC/RS 49-1971 - Tomato Juice

Fish

CAC/RS 50-1971 - Quick Frozen Fillets of Cod and Haddock  
CAC/RS 51-1971 - Quick Frozen Fillets of Ocean Perch

Quick Frozen Fruits

CAC/RS 52-1971 - Quick Frozen Strawberries

LIST OF RELATED RECOMMENDED TEXTS SENT TO GOVERNMENTS

CAC/RM 32-1970 - Standard Procedure for Thawing of Quick Frozen Fruits and Vegetables  
CAC/RM 33-1970 - Standard Procedure for Cooking of Quick Frozen Vegetables

LIST C - THIRD SERIES OF 12 STANDARDS TO BE SENT TO GOVERNMENTS FOR ACCEPTANCE IN 1973

Foods for Special Dietary Uses

Special Dietary Foods with Low-Sodium Content (including Salt Substitutes)

Sugars

Powdered Dextrose (Icing Dextrose)

Processed Fruits and Vegetables

Canned Mushrooms

Canned Asparagus

Canned Tomato Concentrate

Canned Green Peas

Canned Plums

Canned Raspberries

Canned Pears

Canned Strawberries

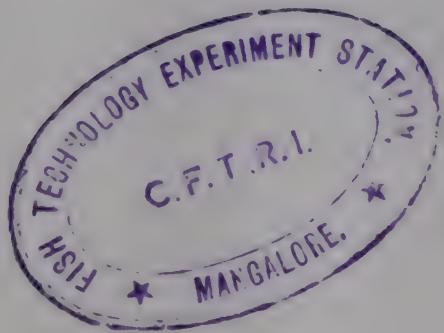
Fruit Juices

Concentrated Apple Juice

Concentrated Orange Juice

OTHER RELATED TEXTS TO BE SENT TO GOVERNMENTS IN 1973

Sampling Plans for Prepackaged Foods (AQL-6.5)



APPENDIX IV

STANDARDS FOR MILK PRODUCTS

LIST OF STANDARDS FOR MILK PRODUCTS ADOPTED BY THE JOINT FAO/WHO COMMITTEE OF  
GOVERNMENT EXPERTS ON THE CODE OF PRINCIPLES CONCERNING MILK AND MILK PRODUCTS  
AND SENT TO GOVERNMENTS FOR ACCEPTANCE

Compositional Standards

Standard No. A-1: Butter and Whey Butter (Redraft)  
Standard No. A-2: Milkfat, Butterfat, Butteroil (Anhydrous)  
(Redraft of Standard No. A-2 for (i) Butteroil and (ii) Anhydrous Butteroil and Anhydrous Milkfat, adopted in 1973)  
Standard No. A-3: Evaporated Milk and Evaporated Skimmed Milk (Redraft)  
Standard No. A-4: Sweetened Condensed Milk and Skimmed Sweetened Condensed Milk (Redraft)  
Standard No. A-5: Whole Milk Powder, Partly Skimmed Milk Powder, and Skimmed Milk Powder (Redraft)  
General Standard No. A-6: Cheese (Redraft under preparation)  
Standard No. A-7: General Standard for Whey Cheese (Redraft)  
General Standard No. A-8 (a): Process(ed) ... Cheese or ... Process(ed) Cheese  
General Standard No. A-8 (b): "Process(ed) Cheese" and "Spreadable Process(ed) Cheese"  
General Standard No. A-8 (c): "Processed Cheese Preparations (Process(ed) Cheese Food and Process(ed) Cheese Spread)  
Standard No. A-10: Cream Powder

Standard Methods of Sampling and Analysis

Standard Method No. B-1: Sampling Methods for Milk and Milk Products  
Standard Method No. B-2: Determination of the Fat Content of Dried Milk  
Standard Method No. B-3: Determination of the Fat Content of Cheese and of Processed Cheese Products  
Standard Method No. B-4: Determination of the Acid Value of Fat from Butter  
Standard Method No. B-5: Determination of the Refractive Index of Fat from Butter  
Standard Method No. B-6: Determination of the Fat Content of Milk  
Standard Method No. B-7: Determination of the Fat Content of Evaporated Milks and of Sweetened Condensed Milks  
Standard Method No. B-8: Determination of the Salt (Sodium Chloride) Content of Butter  
Standard Method No. B-11: Determination of Dry Matter Content in Whey Cheese  
Standard Method No. B-12: Determination of the Phosphorus Content of Cheese and Processed Cheese Products  
Standard Method No. B-13: Determination of the Citric Acid Content of Cheese and Processed Cheese Products  
Standard Method No. B-14: Polarimetric Determination of the Sucrose Content of Sweetened Condensed Milk

Individual Cheese Standards

Standard No. C-1: Cheddar  
Standard No. C-2: Danablu  
Standard No. C-3: Danbo  
Standard No. C-4: Edam  
Standard No. C-5: Gouda  
Standard No. C-6: Havarti  
Standard No. C-7: Samsoe  
Standard No. C-8: Cheshire  
Standard No. C-9: Enmentaler  
Standard No. C-10: Gruyère  
Standard No. C-11: Tilsiter  
Standard No. C-12: Limburger  
Standard No. C-13: Saint-Paulin  
Standard No. C-14: Svecia  
Standard No. C-15: Provolone  
Standard No. C-16: Cottage Cheese including Creamed Cottage Cheese  
Standard No. C-17: Butterkäse  
Standard No. C-18: Coulommiers  
Standard No. C-19: Gudbrandsdalsost (whey cheese)  
Standard No. C-20: Harzer  
Standard No. C-21: Herrgårdsost  
Standard No. C-22: Hushällsost  
Standard No. C-23: Norvegia  
Standard No. C-24: Maribo  
Standard No. C-25: Fynho  
Standard No. C-26: Esrom  
Standard No. C-27: Romadur  
Standard No. C-28: Amsterdam  
Standard No. C-29: Leidse  
Standard No. C-30: Friese

APPENDIX V

RECOMMENDED INTERNATIONAL CODES OF HYGIENIC PRACTICE

LIST OF RECOMMENDED INTERNATIONAL CODES OF HYGIENIC PRACTICE ADOPTED BY THE  
CODEX ALIMENTARIUS COMMISSION AND SENT TO GOVERNMENTS AS RECOMMENDATIONS OF THE COMMISSION

CAC/RCP 1-1969 - General Principles of Food Hygiene

CAC/RCP 2-1969 - Canned Fruit and Vegetables Products

CAC/RCP 3-1969 - Dried Fruit

CAC/RCP 4-1971 - Dried Coconut

CAC/RCP 5-1971 - Dehydrated Fruits and Vegetables including Edible Fungi

CAC/RCP 6-1972 - Tree nuts (sent to Governments in January 1974)

APPENDIX VI

CODES OF PRACTICE DEVELOPED BY FAO DEPARTMENT OF FISHERIES

LIST OF CODES OF PRACTICE DEVELOPED BY FAO DEPARTMENT OF FISHERIES

FISHERY PRODUCTS AND MARKETING BRANCH

Code of Practice for Canned Fishery Products FAO Fish. Circ. No. C315

Code of Practice for Fresh Fish FAO Fish. Circ. No. C318

Code of Practice for Smoked Fish FAO Fish. Circ. No. C321

Code of Practice for Shrimps or Prawns FAO Fish. Circ. No. C322

Code of Practice for Frozen Fish FAO Fish. Circ. No. C145 (Rev. 1)

APPENDIX VII

GUIDELINES FOR ESTABLISHING A MICROBIOLOGICAL STANDARD FOR A FOOD <sup>1/</sup>

When it is decided to establish a microbiological standard for a food or class of foods, the following technical and administrative aspects must be considered:

(1) The standard should be based on factual studies and serve one or more of the following objectives:

- (a) to determine the conditions of hygiene under which the food should be manufactured;
- (b) to minimize the hazards to public health;
- (c) to measure the keeping quality and storage potential of the food

(2) The standard should be attainable under practicable operating and commercial conditions and should not entail the use of excessive heat treatment or the additions of extra preservatives.

(3) The standard should be determined after investigation of the processing operation.

(4) The standard should be as simple and inexpensive to administer as possible, the number of tests being kept to a minimum.

(5) Details of methods to be used for sampling, examining and reporting should accompany all published microbiological standards.

(6) In establishing tolerance levels for the permissible number of defective samples, allowance should be made for sampling and other variations due to differences in the laboratory methods.

The following additional points should be kept in mind:

(1) It is not satisfactory to establish one set of microbiological standards for a miscellaneous group of foods, such as "frozen foods" or "precooked foods".

(2) Microbiological standards should be applied first to the more hazardous types of food on the basis of experience of expected microbiological levels, taking into account variations in composition, processing procedures, and storage.

(3) When a standard is established, there should be a definite relationship between the standard and the hazard against which it is meant to protect the public.

(4) The sensitivity, reliability, and reproducibility of the sampling and analytical methods should be compared in different laboratories and the methods to be used should be specified in detail as part of the standard.

(5) Tolerances should be included in the standard to account for inaccuracies of sampling and analysis.

(6) Standards should be applied on a voluntary basis before compliance is made mandatory.

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1/ From Food-Borne Disease: Methods of Sampling and Examination in Surveillance Programmes, World Health Organization Technical Report Series, 1974, No. 543, pages 7-8.

APPENDIX VIII

GENERAL PRINCIPLES FOR THE USE OF FOOD ADDITIVES <sup>1/</sup>

1. All food additives, whether actually in use or being proposed for use, should have been or should be subjected to appropriate toxicological testing and evaluation. This evaluation should take into account among other things, any cumulative, synergistic or potentiating effects of their use.
2. Only those food additives should be endorsed, which so far as can be judged on the evidence presently available, present no hazard to the health of the consumer at the levels of use proposed.
3. All food additives should be kept under continuous observation and should be re-evaluated whenever necessary in the light of changing conditions of use and new scientific information.
4. Food additives should at all times conform with an approved specification, e.g. the Specifications of Identity and Purity recommended by the Codex Alimentarius Commission.
5. The use of food additives is justified only where they serve one or more of the purposes set out from (a) to (d) and only where these purposes cannot be achieved by other means which are economically and technologically practicable and do not present a hazard to the health of the consumer;
  - (a) to preserve the nutritional quality of the food; an intentional reduction in the nutritional quality of a food would be justified in the circumstances dealt with in sub-paragraph (b) and also in other circumstances where the food does not constitute a significant item in a normal diet;
  - (b) to provide necessary ingredients or constituents for foods manufactured for groups of consumers having special dietary needs;
  - (c) to enhance the keeping quality or stability of a food or to improve its organoleptic properties, provided that this does not so change the nature, substance or quality of the food as to deceive the consumer;
  - (d) to provide aids in manufacture, processing, preparation, treatment, packing, transport or storage of food; provided that the additive is not used to disguise the effects of the use of faulty raw materials or of undesirable (including unhygienic) practices or techniques during the course of any of these activities.
6. Approval or temporary approval for the inclusion of a food additive in an advisory list or in a food standard should:
  - (a) as far as possible be limited to specific foods for specific purposes and under specific conditions;
  - (b) be at the lowest level of use necessary to achieve the desired effect;
  - (c) as far as possible take into account any Acceptable Daily Intake, or equivalent assessment, established for the food additive and the probable daily intake of it from all sources. Where the food additive is to be used in foods eaten by special groups of consumers, account should be taken of the probable daily intake of the food additive by consumers in those groups.

<sup>1/</sup> Codex Alimentarius Commission Procedural Manual, Third Edition Cx 8.7 - 3rd Edition.  
- 1973 pages 69-70.

APPENDIX IX

RECOMMENDATIONS CONCERNING LEGISLATION FOR CONTROL OF IRRADIATED FOODS 1/

There are certain conclusions that can be reached at this time that may provide some general guidance. The three organizations should give consideration to the possibility of convening another consultation group to develop more detailed legal guidance when the results of the various current wholesomeness studies have become known.

1. The ultimate purpose of all food regulations is the protection of health and safety of the consumer, and prevention of deception. Treatment of food by irradiation for the purpose of general human consumption should be regulated at national and eventually at international level. The fundamental lines for such regulations are recommended here below.

2. There should be, until international regulations would materialize, an internationally common approach to the problems for the sake of harmonization of relevant legislation. The Group felt that it was the responsibility of Governments, particularly for the purposes of international trade in irradiated food, to adopt as far as possible uniform lines for regulations.

3. The protection of health and safety of the consumer would be best achieved by subjecting irradiated food to authorization by an enforcement body, before it is allowed on the market.

4. Processing techniques should be evaluated for the safety of the consumer. Even though no standard method of evaluation has so far been established, all authorizations should be based upon sound scientific principles for establishing safety of ingested substances and in accordance with the findings and recommendations of the duly constituted national or international bodies. Recommended technical procedures and tests required to permit an evaluation on the safety for consumption of irradiated food have been outlined in the 1964 Rome report.

Examples of some such information required for safety evaluation are given in Annex B.

5. Food irradiation generally falls into three categories that should be considered separately in developing regulations, as follows:

(a) Low-dose treatment of food for various purposes, including sprout inhibition, insect desinfestation, etc. in the dose ranging of up to 100 krad.

(b) Medium-dose treatment of food to attain radicidation and radurization, i.e. reduction of the number, respectively, of viable specific pathogenic or spoilage micro-organisms, in the dose range of 100 krad to 1 Mrad.

(c) High-dose treatment of food to attain redappatization, i.e. radiation sterilization, in doses of above 1 Mrad.

6. For the purposes of food irradiation, ionizing radiation should be of a type and energy level which does not result in induced radioactivity. Acceptable types of radiation sources, of radiation, and energy levels should be declared and revised by the competent authorities referred to in para. 3 above upon the advice of the advisory scientific bodies referred to in para. 4. Types of radiation and energy levels which may be exempted from the application of the regulations should also be determined by the same bodies.

7. Specific authorizations should be issued for irradiation of individual food items or group of foods.

8. The purpose to be achieved by irradiation process should be stated in the authorization.

1/ Report of a Consultation Group on the Legal Aspects of Food Irradiation, Vienna, 20-24 March 1972, Organized by FAO/IAEA/WHO, pages 9-11 and 27.

9. The type of radiation, the range of absorbed dose and other conditions of irradiation process should be specified in the authorization.

10. The authorization should specify the form and nature of records to be kept by the authorized person, including methods of dosimetry and dosimetry records.

11. The packaging material to be used in the irradiation of pre-packaged food should be clearly defined in the authorization for the specific food item. Packaging materials which may be used in food irradiation could also be permitted through a separate authorization. The safety evaluation of such materials should be made by the appropriate scientific bodies at national or international level.

12. Any legislation should provide for informative labelling. The form or content of an appropriate label should preferably be established internationally. Labels should at least contain information with respect to the fact of irradiation, the country and the name of the food irradiation plant where treatment was undertaken, doses, etc. Labels for irradiated food, whether in bulk or not, should include a warning that the food must not be irradiated again.

13. Whenever necessary the competent authorities should regulate the conditions of storage and transport of irradiated food.

14. The competent authorities should allow exportation of irradiated food only if the importing country has authorized that irradiated food for general human consumption, and only if it is accompanied by a certificate of consignment containing the information required in labelling such as the absorbed dose, etc.

15. Importation of irradiated food should be allowed by the competent authorities of the importing country only if such certificate of consignment as mentioned above accompanies the merchandise.

16. Definitions in a regulation on food irradiation should include the meanings attached to all words and phrases having a unique meaning for the purpose of the regulations. These definitions should include, among others:

Ionizing radiation  
Irradiated food  
Low-dose treatment of food  
Medium-dose treatment of food  
High-dose treatment of food  
Total dose  
Dose units  
Irradiation plant  
Competent authority  
Food contact surface  
Intentional irradiation  
Unintentional irradiation

AN EXAMPLE OF INFORMATION REQUIRED FOR A REQUEST FOR CLEARANCE OF IRRADIATED FOOD

Full and detailed descriptions, particularly of all tests for wholesomeness made on the irradiated food should be made available to the evaluating and authorizing bodies before the marketing of such food is authorized.

Data provided from any source other than the petitioner himself could be taken into account in the evaluation.

- (a) Name and address of the petitioner.
- (b) Description of site of the irradiation plant.
- (c) Brief general description of the food to be irradiated and the technical effect the petitioner is attempting to establish (e.g. inhibition of sprouting).
- (d) Full information on the food to be irradiated, whether it is an unprocessed natural product or has been processed or manufactured, and, if this is the case, its composition in terms of carbohydrate, protein, fat, mineral salts, vitamins and water.
- (e) A description of other preservation methods that will be used on the food and of additives to be included.
- (f) Nature of the pack, the gaseous environment within the pack and a full description of the material or the materials to be used for packaging with special reference to plasticizer or special additives.
- (g) Description of the proposed radiation source.
- (h) Nature and energy of the radiation.
- (j) Proposed mean dose, with upper and lower levels.
- (k) Proposed mean dose rate, with upper and lower levels, and whether the dose will be continuous or delivered in portions; in the latter case with details of the discontinuous delivery.
- (l) Description of proposed method of dosimetry.
- (m) Description of proposed safety measures to ensure that food intended to be irradiated is irradiated, irradiation will not be repeated and the build-up of radiation-resistant micro-organisms is prevented.
- (n) Description of the proposed checks on the efficacy of the safety measures.
- (o) Maximum and minimum intended periods between irradiation and consumption of food.
- (p) Proposed storage and transport conditions.
- (q) Information on whether the food will be stored and marketed in the packaging in which it was irradiated.

(r) Full and detailed description of results of tests for wholesomeness carried out on food that has been packaged, irradiated and stored as described in the petition and carried out on the irradiated food in the state (e.g. cooked) in which it will be consumed, with special reference to:

- induced or residual radioactivity
- nutritional quality
- toxic effects, including mutagenic or carcinogenic effects
- microbiological effects.

(s) Details on the acceptability of the food.

(t) Proposed labelling.

(u) Food contact surfaces for use with food during irradiation should be described.

APPENDIX X

RECOMMENDED INTERNATIONAL GENERAL STANDARD  
FOR THE LABELLING OF PREPACKAGED FOODS

1. DEFINITION OF TERMS

For the purpose of this Standard-

label includes any tag, brand, mark, pictorial or other descriptive matter, written, printed, stencilled, marked, embossed or impressed on, or attached to, a container of food;

labelling includes the label and any written, printed or graphic matter relating to and accompanying the food;

container means any form of packaging of food for sale as a single item, whether by completely or partially enclosing the food, and includes wrappers;

prepackaged means packaged or made up in advance, ready for retail sale in a container;

ingredient means any substance, including a food additive, used in the manufacture or preparation of a food and present in the final product;

component means any substance which forms part of an "ingredient."

2. GENERAL PRINCIPLES

2.1 Prepackaged food shall not be described or presented on any label or in any labelling in a manner that is false, misleading or deceptive or is likely to create an erroneous impression regarding its character in any respect.

2.2 Prepackaged food shall not be described or presented on any label or in any labelling by words, pictorial or other devices which refer to or are suggestive either directly or indirectly, of any other product with which such food might be confused, or in such a manner as to lead the purchaser or consumer to suppose that the food is connected with such other product.

3. MANDATORY LABELLING OF PREPACKAGED FOODS

The labels of all prepackaged food shall bear the information required by sub-sections 3.1 to 3.5 of this section, as applicable to the food being labelled, except to the extent otherwise expressly provided in a specific Codex Standard.

3.1 The name of the food

(a) The name shall indicate the true nature of the food and normally be specific and not generic.

(b) Where a name or names have been established for a food in a Codex Standard, at least one of these names shall be used.

(c) In other cases, a common or usual name shall be used, if one exists.

(d) Where no common name exists, an appropriate descriptive name shall be used.

(e) A "coined" or "fanciful" name, however, may be used provided it is not misleading and is accompanied by an appropriately descriptive term.

### 3.2 List of ingredients

(a) A complete list of ingredients shall be declared on the label in descending order of proportion, except-

(i) as otherwise provided in a Codex Standard;

(ii) in the case of dehydrated foods which are intended to be reconstituted by the addition of water, the ingredients may be listed in order of proportion in the reconstituted product provided that the list of ingredients is headed by a statement such as "ingredients when reconstituted";

(iii) in the case of foods in respect of which the national legislation does not require a complete declaration of ingredients provided that such exemptions have been granted because the food is of well known composition, and the absence of a declaration of ingredients is not prejudicial to the consumer, and the information provided on the label enables the consumer to understand the nature of the food.

(b) Where an ingredient of a food has more than one component, the names of the components shall be included in the list of ingredients, except where such an ingredient is a food for which a Codex Standard has been established and such standard does not require a complete list of ingredients.

(c) A specific name shall be used for ingredients in the list of ingredients except that-

(i) for ingredients falling in the respective classes, the following class titles may be used:

animal fats	herbs
animal oils	spices
vegetable fats	starches
vegetable oils	(except modified starches)

(ii) for substances falling in the respective classes and appearing in Codex Standards or Codex lists of food additives permitted for use in foods generally, the following class titles may be used;

anti-caking agents
antioxidants
bleaching agents
colours
emulsifiers
flavours
maturing agents
preservatives
stabilizers
thickening agents (including modified starches)
vegetable gums

(d) Added water shall be declared in the list of ingredients if such a declaration would result in a better understanding of the product's composition by the consumer except when the water forms part of an ingredient such as brine, syrup or broth used in a compound food.

### 3.3 Net contents

(a) The net contents shall be declared in either the metric ("Système International" units) or avoirdupois or both systems of measurement as required by the country in which the food is sold. This declaration shall be made in the following manner:

(i) for liquid foods, by volume;

(ii) for solid foods, by weight, except that when such foods are usually sold by number a declaration by count may be made;

(iii) for semi-solid or viscous foods, either by weight or volume.

(b) Foods packed in a liquid medium normally discarded before consumption shall carry a declaration of the drained weight of the food.

### 3.4 Name and address

The name and address of the manufacturer, packer, distributor, importer, exporter or vendor of the food shall be declared.

### 3.5 Country of origin

(a) The country of origin of a food shall be declared if its omission would mislead or deceive the consumer.

(b) When a food undergoes processing in a second country which changes its nature, the country in which the processing is performed shall be considered to be the country of origin for the purposes of labelling.

## 4. PRESENTATION OF MANDATORY INFORMATION

### 4.1 General

Statements required to appear on the label by virtue of this Standard or any other Codex Standards shall be clear, prominent and readily legible by the consumer under normal conditions of purchase and use. Such information shall not be obscured by designs or by other written, printed or graphic matter and shall be in contrasting colour to that of the background. The letters in the name of the food shall be in a size reasonably related to the most prominent printed matter on the label. Where the container is covered by a wrapper, the wrapper shall carry the necessary information, or the label on the container shall be readily legible through the outer wrapper or not obscured by it. In general, the name and net content of the food shall appear on that portion of the label normally intended to be presented to the consumer at the time of sale.

### 4.2 Language

The language used for the declaration of the statements referred to in paragraph 4.1 shall be a language acceptable to the country in which the food is intended for sale. If the language on the original label is not acceptable, a supplementary label containing the mandatory information in an acceptable language may be used instead of relabelling.

## 5. ADDITIONAL OR DIFFERENT REQUIREMENTS FOR SPECIFIC FOODS

5.1 Nothing in this Standard shall preclude the adoption of additional or different provisions in a Codex Standard, in respect of labelling, where the circumstances of a particular food would justify their incorporation in that Standard.

## 5.2 Irradiated Foods

Foods which have been treated with ionizing radiation shall be so designated.

## 6. OPTIONAL LABELLING

### 6.1 General

Any information or pictorial device may be displayed in labelling provided that it is not in conflict with the mandatory requirement nor would mislead or deceive the consumer in any way whatsoever in respect of the food.

### 6.2 Grade Designations

If grade designations are used, they should be readily understandable, and not be misleading or deceptive in any way.

## APPENDIX XI

### AN OUTLINE OF THE WORK AND PROCEDURES OF THE CODEX ALIMENTARIUS COMMISSION AND ITS SUBSIDIARY BODIES

#### INTRODUCTION

It was against a background of rapidly increasing interest in trade problems that the Member Governments of the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) decided that the time was opportune to create arrangements for international action to try to remove non-tariff obstacles to the trade in foodstuffs caused by differing national food legislations. At the same time, the Member Governments of FAO and WHO emphasized the need to ensure that proper safeguards be maintained or established for the protection of the health of the consumer. It might therefore be of interest to recall briefly how FAO and WHO became involved in this type of activity.

#### Immediate background to the establishment of the Codex Alimentarius Commission

FAO and WHO are relatively newcomers to the subject of international food standards. In 1958 work was begun by an FAO Committee of Government Experts, in collaboration with the International Dairy Federation, on the establishment of a Code of Principles concerning Milk and Milk Products and compositional standards for milk products. This is, in fact, an international code of conduct for the use of proper designations, definitions and fair practices in the international trade in dairy products. The Committee has gone on to elaborate compositional standards for the main milk products and also for specific commodities such as cheese varieties important in world trade. The Committee, as its work progressed, developed the following procedure which at that time was new in international circles. Having reached preliminary agreement on the technical aspects of the work, it would refer its decisions to governments for comments and then, in the light of these comments, the Committee would endeavour to finalize standards which were then presented for acceptance by governments. These arrangements have proved to be very successful as will be seen later in this article. A further development which took place in 1958, and which was to prove of great importance to both FAO and WHO in introducing an international programme for the elaboration of food standards, was the creation of a body known as the Codex Alimentarius Europaeus. This body was set up jointly by the International Commission on Agricultural Industries and the Permanent Bureau of Analytical Chemistry. The prime mover in the creation of this body was the late Dr. H. Frenzel, a former Austrian Minister. The Codex Alimentarius Europaeus soon ran into certain procedural as well as financial difficulties. Although its initial approach to food standards work was more closely akin to that followed by the German-speaking countries, other European countries outside the immediate membership of the body began to take an interest in the need to approach the subject either on a truly regional or on a world-wide basis.

In 1961 the Council of the European Codex Alimentarius adopted a resolution proposing that the work should be taken over by FAO and WHO. From that moment matters moved quickly; the time was apparently ripe for the establishment of a wide forum in which governments from all over the world could get together to try to harmonize their various approaches to food standards questions. The governing bodies of FAO and WHO approved the establishment of a Joint FAO/WHO Food Standards Programme, the creation of a jointly sponsored body to be known as the Codex Alimentarius Commission to implement the Programme and the holding of an inaugural Conference on Food Standards in 1962 which was to lay down guidelines for the first session of the Codex Alimentarius Commission held in 1963. This briefly is the background to the birth of the Codex Alimentarius Commission. Some years ago, when the Commission held its first session, 30 countries, almost all of which were developed countries, were Members of the Commission. Membership has trebled since that time, and today over a hundred countries are Members of the Commission, the large majority of them being developing countries. It can reasonably be claimed that the Commission has assumed the leading rôle in establishing international food standards throughout the world.

#### Purpose of objectives of the work of the Codex Alimentarius Commission

The Commission's work is motivated by two main considerations: (i) the protection of the consumer against health risks and fraud; and (ii) the need for the widest possible measure of international agreement on food standards in order to facilitate international trade. The objectives of the Commission are to develop international food standards on a world-wide or, where appropriate, on a regional or group of countries basis, to publish these standards in a food code, the Codex Alimentarius, and to record the acceptance and implementation of these standards by governments. The Commission collaborates with a very large number of international and national bodies concerned with the elaboration of food standards in different parts of the world. One of the basic objectives of the Commission is to try to coordinate all the food standards work of international governmental and non-governmental organizations and to channel this into a meaningful but unified food code. Since the first session of the Commission in 1963, strong and valuable ties of cooperation and working relations on matters of mutual interest have been established with a very large number of organizations interested in the various aspects of food standardization. One of the principal reasons for the close collaboration which has been achieved by the Commission and other organizations is that a genuine attempt has been made to avoid any duplication of the work of the other organizations.

#### Approach of the Codex Alimentarius Commission to the elaboration of international food standards

The Commission has embarked on an extensive programme of work covering the compositional, labelling, additive, contaminant, pesticide residue, hygiene, sampling and analytical aspects of foods. Much of this work is being carried out by subsidiary bodies of the Commission or in cooperation with other international organizations or specialized bodies. Fortunately, the Commission has not fallen into the trap which has ensnared some other bodies in similar fields in the past, namely of trying to work solely on existing national legislations and endeavouring to harmonize them without proper regard to the substance behind the laws. The Commission's approach has been different. It has set out to secure international agreement on the substance of food standards and then to invite governments to accept these standards in various specified ways. This leaves governments free to proceed in accordance with their own national and constitutional procedures and to advise the Commission as to how implementation of the standards is to be achieved in their countries. The soundness of this approach has already been clearly demonstrated in the case of the FAO/WHO standards for milk products.

#### Method of working of the Codex Alimentarius Commission

The Commission has held ten regular sessions. Some of its work - especially at the earlier sessions - has been of a procedural nature rather than a technical review of standards. This is because the Commission, from the beginning, recognized the importance of and the need for a proper procedure and well-defined methods of working. Thus it is of interest to indicate briefly the methods employed. The development of standards is done by subsidiary bodies known as Codex Committees. The committees can be divided into two broad groups - those dealing with general subjects, such as hygiene or labelling, which are applicable to all foods and those dealing with specific foodstuffs. A unique feature of the methods used is that responsibility for running the various Codex Committees and for piloting the standards through the Steps of the Procedure for the Elaboration of Codex Standards is undertaken by various governments which have indicated their willingness to undertake this task. The fact that many governments have been willing to incur the not inconsiderable expense of hosting Codex Committees is, in itself, a clear indication of the value and importance which these governments attach to such work. There are a number of subsidiary bodies which are not hosted by individual governments. These include two Joint UNECE/Codex Alimentarius Groups of Experts working on standards for fruit juices and quick-frozen foods, an FAO/WHO Committees of Government Experts working on standards for milk and milk products, and a Group of Experts under the joint auspices of the International Olive Oil Council and the Codex Alimentarius Commission, working on a standard for table olives.

The Commission has developed a detailed procedure for the elaboration of Codex standards. After a draft standard has first been considered by the Committee concerned, the procedure allows for two rounds of comments by governments, two examinations by the Committee and two considerations by the Commission before the standard is formally sent to governments for acceptance. While this procedure appears to be lengthy, it has been deliberately designed to give governments the fullest opportunity to comment on standards while they are still in draft and to enable the Commission to satisfy itself that the standards are being prepared along the right lines. Any procedure for the elaboration of international standards which fails to give governments adequate time to reflect on, and to consider, the standards from all aspects would, in the long run, be self-defeating. The lack of proper procedures has been the rock on which many previous attempts to secure international agreement on food standards have foundered. Normally it takes about four to five years for a standard to be developed and adopted by the Commission.

#### Progress to-date on acceptance of International Food Standards

So far this procedure seems to have worked well, judging by the fact that the Commission has already adopted around seventy international standards and that a considerable number of countries have given acceptance to many of the standards in the first batch of 42 standards sent to governments for acceptance. Governments are not asked to accept Codes of Hygiene Practice; which are elaborated for certain commodity groups or for specialist products. Rather it is up to governments to make such use of the codes as they think fit. The codes should be especially useful to developing countries.

In addition to the above-mentioned standards adopted by the Codex Alimentarius Commission, many standards for milk products have been adopted by the Joint FAO/WHO Committee of Government Experts on the Code of Principles concerning Milk and Milk Products. This Committee, although it is a subsidiary body of the Commission, enjoys a special status in that it is empowered to adopt its own standards for issue to governments for acceptance.

#### Protection of the consumer

A great deal of progress has been made on matters which can be said to relate directly to the protection of the health of the consumer. Of particular interest are the activities of the Commission and its subsidiary bodies in respect of food additives, contaminants, pesticide residues, food hygiene and labelling.

#### Food additives

The approach used internationally to the evaluation of the safety in use of both food additives and pesticides is similar in that (i) the need for their use has to be established and when established, the amounts used should be no more than is necessary to achieve the desired effect or result; and (ii) for both food additives and pesticide residues the toxicologists establish acceptable daily intakes (ADIs). Even though there is this similarity of approach it is, for reasons explained later, more difficult to reach international agreement on world-wide limits for pesticide residues than for food additives. Regarding food additives, it is not too difficult for governments to reach agreement on the maximum level of use required to achieve any particular purpose, although it is only proper to add that sometimes the justification for their use is called in question; the use of artificial colours is a good example. What has proved to be more difficult has been how to assess the total intake of a particular food additive in the diet in the absence of detailed food consumption data from countries. WHO has, however, established a computerized system by means of which an estimate is made of the potential daily intake of individual food additives. The potential daily intake, together with the acceptable daily intake (ADI) established by the Joint FAO/WHO Expert Committee on Food Additives, are necessary items of information in order to enable the Codex Committee on Food Additives to reach conclusions concerning the acceptability, from a toxicological point of view, of limits for food additives proposed by Codex Commodity Committees dealing with standards for individual commodities. The Commission scrutinizes closely all proposed uses of food additives, both from the point of view of safety as well as technological need. One of the consequences of this

work has been the stimulation of research in various countries and, in particular, additional toxicological research even in the case of a number of additives which have been permitted for many years in national legislations. The Commission, in addition to having approved several hundred specific food additive provisions in Codex standards, has now established a first list of (a) additives which it considers to be safe for use in foods, and (b) additives which it considers to be unsafe for use in foods. This work is of a continuing nature and the first lists were published in 1973. Member Governments of FAO and WHO are also examining a large number of specifications of identity and purity for food additives. These specifications will, in due course, be submitted to governments for acceptance.

#### Pesticide residues

Pesticide residues at the international level present many more complex problems and difficult issues than food additives. Whilst the toxicological evaluation of pesticides and their degradation products remain of paramount importance, it is essential to take into full account good agricultural practices. Such practices are relative and differ from country to country in accordance with varying problems regarding pest control, infestation and climatic conditions. Other important problems are concerned with sampling and analysis of residues. The Commission is therefore making an examination of various approaches which could be followed in determining the presence of pesticide residues, the maximum levels of such residues which might be permitted in raw materials and, above all, the quantity of residue which may be safely ingested by the consumer. Sixty-six pesticides have been evaluated and tolerances have been proposed for their residues in a wide range of foods. Work in this field is likely to be of a continuing nature due to problems of pest resistance which require the formulation of new compounds as well as the increasing application of agricultural chemicals throughout the world under widely varying conditions. In submitting international tolerances to the Commission for adoption the Codex Committee on Pesticide Residues relies on the expert evaluation by the Joint Meeting of the FAO Working Party of Experts on Pesticide Residues and the WHO Expert Committee on Pesticide Residues of all available data, both toxicological and those relating to good agricultural practice. To-date, three series of Recommended International Tolerances for Pesticide Residues, covering the residues of 18 pesticides and involving some 90 specific tolerances in a wide range of foods, have been sent to governments for acceptance.

#### Food hygiene

Perhaps the most difficult aspect of the Commission's work to-date has been how to tackle internationally the subject of food hygiene. The major concern of any government dealing with this subject is to establish proper arrangements which will ensure the fitness of food for human consumption. This is, of course, considerably easier to deal with nationally than internationally. The Codex Committee on Food Hygiene has held eleven annual sessions. It has received much advice and assistance from other international organizations which have been working in this field for a number of years. In particular, it has received valuable background documentation from the International Commission on Microbiological Specifications for Foods (ICMSF) which was set up by the International Association of Microbiological Societies (IAMS), and also from the International Organization for Standardization (ISO). Nevertheless, in spite of the information supplied by governments and research bodies in this field, microbiological standards have proved to be a highly controversial subject from the point of view of Codex standards.

Among the Member Governments of FAO and WHO there are proponents of the advantages of establishing microbiological standards for all foods. Other countries consider that microbiological standards could be practical only for a very restricted number of products and that, even in these cases, they would not justify any relaxation in plant inspection and detailed supervision of food throughout the whole chain of distribution. When these opinions are considered from an international point of view, the question arises as to how a country can determine if an imported food has been correctly prepared under proper conditions of hygiene. At first sight, the solution might appear to be the laying down

of microbiological standards. However, variations in methods of sampling and analysis of food, the procedures followed by various public health laboratories, the absence of agreement on microbiological tests, and the significance to be attached to their results make it extremely difficult to reach any international agreement.

The Codex Committee on Food Hygiene has taken the first step to undertake work of microbiological end-product specifications for individual foods. The controversial nature of this subject calls for recommendations being obtained at an independent expert level in the first instance. Proposals have been formulated with a view to convening, with the support of the UN Environment Programme (UN Conference on Human Environment, Stockholm 1972), Joint FAO/WHO Expert Meetings on Food Microbiology in 1974 and annually thereafter, for a number of years. In the meantime, it has been agreed that provisions in Codex standards in respect of hygiene may need to be mandatory, whether or not they are capable of verification by the public health authorities of an importing country.

The governments participating in the work of the Codex Committee on Food Hygiene concluded that, as a first step, codes of hygienic practice should be elaborated which will be of assistance to all countries engaged in the international trade in specific foods. Based upon the experience of the problems and difficulties which some governments have encountered in respect of imported foods, the Codex Committee on Food Hygiene has established a programme of work designed to cover those products which can present serious public health hazards.

The Committee has elaborated a Code of Practice on the General Principles of Food Hygiene and five codes of hygienic practice. These are for dried fruits, canned fruits and vegetable products, dehydrated fruits and vegetables including edible fungi, desiccated coconut and tree nuts, all of which have been adopted by the Commission. The Committee on Food Hygiene is elaborating codes of hygienic practice for egg products, poultry processing, molluscan shellfish, groundnuts and frog legs. In addition, the FAO Fisheries Department is elaborating, in collaboration with the Codex Committee on Fish and Fishery Products, codes of both technological and hygienic practice for various kinds of fish and fishery products.

In general, the codes of hygienic practice deal with the raw material requirements (including environmental hygiene in the growing and raw food material production areas, hygienic harvesting and production of raw materials, transportation); processing plant facilities (including construction layout, equipment and utensils); hygienic operating requirements and practices including laboratory control and other procedures; and, where appropriate, end product specifications. It is hoped that these codes will perform a useful educational rôle, especially in developing countries and may even form the basis of international agreement among countries as to the basic hygienic conditions which will have to be met to ensure that food is fit for human consumption. Requirements concerning specific methods of processing may prove to be a large part of the solution to these difficulties.

A further important development has been the establishment of a Codex Committee on Meat Hygiene which is developing a code of hygienic practice for fresh meat and a code of ante-mortem and post-mortem inspection of slaughter animals for human consumption.

#### Food labelling

One of the most vexatious problems which the exporter of foodstuffs is likely to encounter is the wide disparity among different countries' requirements in respect of labelling. The Codex Committee on Food Labelling therefore established, as a first priority, a General Standard for the Labelling of Prepackaged Foods. This General Standard has been finalized by the Commission and sent to Member Governments for acceptance. The General Standard serves as a point of departure or model for Codex Commodity Committees in drawing up the labelling sections of individual commodity standards. By and large, the provisions in the General Standard are adhered to by the Commodity Committees but, as envisaged in the General Standard, the nature of some commodities may be such as to require or justify

Some departure from, or addition to, the provisions in the General Standard. The Committee is about to start work on the subject of the advertisement of food, with particular reference to claims and misleading descriptions. A further subject which the Committee will be looking into is that of nutritional labelling. The labelling of bulk containers is also engaging the Committee's attention.

#### The Tenth Session of the Codex Alimentarius Commission (Rome 1-12 July 1974)

The Commission had, at its Ninth Session agreed to establish a Coordinating Committee for Africa. This Committee held its first meeting in July 1974. Both Latin America and Asia had indicated interest and it was agreed to hold an FAO/WHO Food Standards Regional Conference for Asia in 1975.

At the Tenth Session the Coordinating Committee for Latin America was established and it was agreed in principle to set up a Coordinating Committee for Asia to follow the Food Standards Regional Conference noted above.

These activities demonstrate the increasing interest of the African, Latin American and Asian countries in the work of the Commission and in the benefits they expect to derive therefrom. It also demonstrates the Commission's increasing awareness of the need to place more emphasis on the requirements of the developing countries and for the provision of an intergovernmental forum within the framework of the Commission, to deal with the problems of these regions in the food standards field.

#### Recent developments

Pollution of the environment is now a subject which has been brought home to us all: the subject is now expounded on radio and television, in newspaper articles and magazines. The United Nations Conference on Human Environment held in Stockholm in June 1972 has focused the attention of the world on the environmental hazards to human health. These hazards can be present in food and the risk of contamination of food by chemical and biological agents has increased. The contaminants may arise from environmental and industrial pollution, and from food processing practices. In addition, some of the most dangerous food contaminants are naturally occurring and if any part of the food chain should become contaminated, the contaminant is likely to enter the human food supply. This presents a potential hazard to human health as well as an impediment to world trade.

The present priorities and workload of the Commission and its subsidiary bodies in the field of the chemical contamination of food reflect the wish of Member Governments to expedite and expand the work on the establishment of tolerances for pesticide residues (approved usage) and maximum limits for permitted food additives and contaminants or residues of contaminants arising, in the main, from the production and processing of foods.

#### The future

It is clear that interest in the value of the work of the Codex Alimentarius Commission continues to grow. The increasing membership of the Commission, the demand for Coordinating Committees in Africa, Latin America and Asia, the recognition by the UN Conference on Human Environment of the facilities afforded by the Codex machinery in reaching international agreement, all point to this. The interest in protecting the health of the consumer and in the need to facilitate international trade are stronger today than ever. Governments now recognize fully the need to participate in the work of the Codex Alimentarius Commission and are doing so in a spirit of compromise and willingness to make concessions, in order to secure international agreement. Recent acceptances of the Codex standards demonstrate the wish of many governments to give effect to international food standards. In the long run, the Codex Alimentarius will be judged by the degree of success in achieving its primary task, namely inducing governments to accept and implement internationally agreed food standards. It is too early yet to form a judgement on this, but the indications are that governments are taking the work of the Codex Alimentarius Commission very seriously and if a reasonable degree of success is achieved, then the work of the Codex Alimentarius Commission will be of lasting value for all concerned with the international trade in food, whether they be producers, exporters, importers or consumers.

## GENERAL PRINCIPLES OF THE CODEX ALIMENTARIUS

### 1. Purpose of the Codex Alimentarius

The Codex Alimentarius is a collection of internationally adopted food standards presented in a uniform manner. These food standards aim at protecting consumers' health and ensuring fair practices in the food trade. The Codex Alimentarius also includes provisions of an advisory nature in the form of codes of practice, guidelines and other recommended measures intended to assist in achieving the purposes of the Codex Alimentarius. The publication of the Codex Alimentarius is intended to guide and promote the elaboration and establishment of definitions and requirements for foods to assist in their harmonization and in doing so to facilitate international trade.

### 2. Scope of the Codex Alimentarius

The Codex Alimentarius includes standards for all the principal foods, whether processed, semi-processed or raw, for distribution to the consumer. Materials for further processing into foods should be included to the extent necessary to achieve the purposes of the Codex Alimentarius as defined. The Codex Alimentarius includes provisions in respect of food hygiene, food additives, pesticide residues, contaminants, labelling and presentation, methods of analysis and sampling. It also includes provisions of an advisory nature in the form of codes of practice, guidelines and other recommended measures.

### 3. Nature of Codex Standards

Codex standards contain requirements for foods aimed at ensuring for the consumer a sound, wholesome food product free from adulteration, correctly labelled and presented. A Codex standard for any food or foods should be drawn up in accordance with the Format for Codex Commodity Standards and contain, as appropriate, the criteria listed therein.

### 4. Acceptance of Codex Commodity Standards

A. A Codex standard may be accepted by a country in accordance with its established legal and administrative procedures in respect of distribution of the product concerned, whether imported or home-produced, within its territorial jurisdiction in the following ways:

#### (i) Full acceptance

(a) Full acceptance means that the country concerned will ensure that a product to which the standard applies will be permitted to be distributed freely, in accordance with (c) below, within its territorial jurisdiction under the name and description laid down in the standard, provided that it complies with all the relevant requirements of the standard.

(b) The country will also ensure that products not complying with the standard will not be permitted to be distributed under the name and description laid down in the standard.

(c) The distribution of any sound products conforming to the standard will not be hindered by any legal or administrative provisions in the country concerned relating to the health of the consumer or to other food standard matters except for considerations of human, plant or animal health which are not specifically dealt with in the standard.

#### (ii) Target acceptance

Target acceptance means that the country concerned indicates its intention to accept the standard after a stated number of years and will meanwhile not hinder within its territorial jurisdiction the distribution of any sound products conforming to the standard by any legal or administrative provisions relating to the health of the consumer or to other food standard matters except for considerations of human, plant or animal health which are not specifically dealt with in the standard.

(iii) Acceptance with minor deviations

Acceptance with minor deviations means that the country concerned gives full acceptance as defined in paragraph 4.A (i) to the standard with the exception of minor deviations which are recognized as such by the Codex Alimentarius Commission; it being understood that a product complying with the standard as qualified by such minor deviations will be permitted to be distributed freely within the territorial jurisdiction of the country concerned. The country concerned will further include in its declaration of acceptance a statement of such deviations, the reasons for them, and also indicate:

- (a) whether products fully conforming to the standard may be distributed freely within its territorial jurisdiction in accordance with paragraph 4.A(i);
- (b) whether it expects to be able to give full acceptance to the standard and, if so, when.

A country which considers that it cannot accept the standard in any of the ways mentioned above should indicate:

- (i) Whether products conforming to the standard may be distributed freely within its territorial jurisdiction;
- (ii) in what ways its present or proposed requirements differ from the standard, and, if possible the reasons for these differences.
- (iii) A country which accepts a Codex standard according to one of the provisions of paragraph 4.A is responsible for the uniform and impartial application of the provisions of the standard as they apply to all home-produced and imported products distributed within its territorial jurisdiction. In addition, the country should be prepared to offer advice and guidance to exporters and processors of products for export to promote understanding of and compliance with the requirements of importing countries which have accepted a Codex standard according to one of the provisions of paragraph 4.A.
- (iv) Where, in an importing country, a product claimed to be in compliance with a Codex standard is found not to be in compliance with that standard, whether in respect of the label accompanying the product or otherwise, the importing country should inform the competent authorities in the exporting country of all the relevant facts and in particular the details of the origin of the product in question (name and address of the exporter), if it is thought that a person in the exporting country is responsible for such non-compliance.

5. Acceptance of Codex General Standards

A. A Codex general standard may be accepted by a country in accordance with its established legal and administrative procedures in respect of the distribution of products to which the general standard applies, whether imported or home-produced, within its territorial jurisdiction in the following ways:

(i) Full acceptance

Full acceptance of a general standard means that the country concerned will ensure, within its territorial jurisdiction, that a product to which the general standard applies will comply with all the relevant requirements of the general standard except as otherwise provided in a Codex commodity standard. It also means that the distribution of any sound products conforming with the standard will not be hindered by any legal or administrative provisions in the country concerned, which relate to the health of the consumer or to other food standard matters and which are covered by the requirements of the general standard.

(ii) Target acceptance

Target acceptance means that the country concerned indicates its intention to accept the general standard after a stated number of years.

(iii) Acceptance with minor deviations

Acceptance with minor deviations means that the country concerned gives full acceptance as defined in paragraph 5.A(i) to the general standard with the exceptions of minor deviations which are recognized as such by the Codex Alimentarius Commission. The country concerned will include in its declaration of acceptance a statement of such deviations, the reasons for them, and also indicate whether it expects to be able to give full acceptance to the general standard and, if so, when.

B. A country which considers that it cannot accept the general standard in any of the ways mentioned above should indicate in what ways its present or proposed requirements differ from the general standard, and, if possible, the reasons for these differences.

(i) A country which accepts a general standard according to one of the provisions of paragraph 5.A is responsible for the uniform and impartial application of the provisions of the standard as they apply to all home-produced and imported products distributed within its territorial jurisdiction. In addition, the country should be prepared to offer advice and guidance to exporters and processors of products for export to promote understanding of and compliance with the requirements of importing countries which have accepted a general standard according to one of the provisions of paragraph 5.A.

(ii) Where, in an importing country, a product claimed to be in compliance with a general standard is found not to be in compliance with that standard, whether in respect of the label accompanying the product or otherwise, the importing country should inform the competent authorities in the exporting country of all the relevant facts and in particular the details of the origin of the product in question (name and address of the exporter), if it is thought that a person in the exporting country is responsible for such non-compliance.

6. Withdrawal or Amendment of Acceptance

The withdrawal or amendment of acceptance of a Codex standard by a country shall be notified in writing to the Codex Alimentarius Commission's Secretariat who will inform all Member States and Associate Members of FAO and WHO of the notification and its date of receipt. The country concerned should provide the information required under paragraphs 4.A(iii), 5.A(iii), 4.B or 5.B above, whichever is appropriate. It should also give as long a notice of the withdrawal or amendment as is practicable.

## SUBSIDIARY BODIES OF THE CODEX ALIMENTARIUS COMMISSION

The Codex Alimentarius Commission has an Executive Committee which acts on behalf of the Commission as its executive organ between sessions of the Commission and makes proposals to the Commission regarding the general orientation and programme of work of the Commission. The Executive Committee consists of the Chairman and three Vice-Chairmen of the Commission together with six further members, elected by the Commission at regular sessions from among the Members of the Commission, one each coming from the following geographic locations: Africa, Asia, Europe, Latin America, North America, South West Pacific. Not more than one delegate from any one country may be a Member of the Executive Committee.

## SUBSIDIARY BODIES OF THE COMMISSION

### A. WORLD-WIDE COMMITTEES

#### Joint FAO/WHO Committee of Government Experts on the Code of Principles concerning Milk and Milk Products

This Committee met for the first time in September 1958, and has been convened regularly each year since 1958. Having been established before the Codex Alimentarius Commission came into being, it was subsequently integrated into the Codex framework.

##### **Responsibility:**

The Codex Alimentarius Commission decided that the Committee would be competent to consider and elaborate all codes and standards concerning milk and milk products, and pass them, as appropriate, through all the steps of the Procedure for the Elaboration of International Standards for Milk Products. It would cause them to be submitted to governments for acceptance, except that decisions of the Committee, whether on standards or not, would be subject to review by the Commission at the request of a Member of the Commission. The Committee will consider the acceptance received in the light of the General Principles of the Codex Alimentarius and will report on these acceptances to the Codex Alimentarius Commission. The Commission will decide in the light of these acceptances whether the standard shall be published in the Codex Alimentarius as a world-wide standard. Those provisions of standards formulated by the Committee of Government Experts which relate to additives, labelling and hygiene would be subject to the procedure for endorsement by the appropriate Codex General Subject Committees. Methods of analysis and sampling formulated by the Committee of Government Experts would not, however, be subject to endorsement by the Codex Committee on Methods of Analysis and Sampling.

#### CODEX COMMITTEE ON FOOD ADDITIVES

**Host Government:** Netherlands

##### **Responsibility:**

To endorse or establish permitted levels of use for individual food additives and maximum permitted levels for contaminants in specific food items. The preparation of lists of food additives for toxicological evaluation by the Joint FAO/WHO Expert Committee on Food Additives.

CODEX COMMITTEE ON FOOD HYGIENE

Host Government: U.S.A.

Terms of reference:

- (a) to draft basic provisions on food hygiene applicable to all foods;
- (b) (i) to consider, amend if necessary, and endorse provisions on hygiene prepared by Codex commodity committees and contained in Codex commodity standards, or
  - (ii) to draft provisions on hygiene in respect of a particular food coming within the terms of reference of a Codex commodity committee at the request of that committee;
- (c) to draft, where necessary, provisions on hygiene in respect of any food not assigned to any Codex commodity committee;
- (d) to consider specific hygiene problems assigned to it by the Commission.

CODEX COMMITTEE ON FOOD LABELLING

Host Government: Canada

- (a) to draft provisions on labelling applicable to all foods;
- (b) to consider, amend if necessary, and endorse draft specific provisions on labelling prepared by the Codex commodity committees drafting commodity standards;
- (c) to study specific labelling problems assigned to it by the Commission;
- (d) to study problems associated with the advertisement of food with particular reference to claims and misleading descriptions.

CODEX COMMITTEE ON GENERAL PRINCIPLES

Host Government: France

Responsibility:

To deal with such procedural and general matters as are referred to it by the Codex Alimentarius Commission. The Committee established the General Principles which define the purpose and scope of the Codex Alimentarius, the nature of Codex standards and the forms of acceptance by countries of Codex standards.

CODEX COMMITTEE ON METHODS OF ANALYSIS AND SAMPLING

Host Government: Federal Republic of Germany  
(1st to 6th sessions)

Hungary

Terms of reference:

- (a) to specify standard methods which are generally applicable to a number of foods;
- (b) (i) to consider, amend if necessary, and endorse draft methods proposed by Codex committees in the drafting of Codex standards, or
  - (ii) to develop at the request of and in collaboration with such committees such methods for subsequent endorsement by it;

- (c) to revise as necessary such methods; and
- (d) to consider specific sampling and analysis problems assigned to it by the Commission.

#### CODEX COMMITTEE ON PESTICIDE RESIDUES

Host Government: Netherlands

Responsibility:

To propose international tolerance for pesticide residues in specific foods. A further responsibility is the preparation of a list of priorities of those pesticide residues found in food commodities entering international trade for toxicological evaluation by the WHO Expert Committee on Pesticide Residues and examination by the FAO Working Party on Pesticides.

#### CODEX COMMITTEE ON COCOA PRODUCTS AND CHOCOLATE

Host Government: Switzerland

Responsibility:

To elaborate world-wide standards for cocoa products and chocolates.

#### CODEX COMMITTEE ON SUGARS

Host Government: U.K.

Responsibility:

To elaborate world-wide standards for all types of sugars and sugar products.

#### CODEX COMMITTEE ON PROCESSED FRUITS AND VEGETABLES

Host Government: U.S.A.

Terms of reference:

To elaborate world-wide standards for all types of processed fruits and vegetables including dried products, canned dried peas and beans, jams and jellies, but not dried prunes, or fruit and vegetable juices.

#### CODEX COMMITTEE ON FATS AND OILS

Host Government: U.K.

Responsibility:

To elaborate world-wide standards for fats and oils of animal, vegetable and marine origin including margarine and olive oil.

#### CODEX COMMITTEE ON MEAT

Host Government: Federal Republic of Germany

Terms of reference:

To elaborate world-wide standards and/or descriptive texts and/or codes of practice as may seem appropriate for the classification, description and grading of carcasses and cuts of beef, veal, mutton, lamb and pork.

CODEX COMMITTEE ON MEAT HYGIENE

Host Government: New Zealand

Terms of reference:

To elaborate world-wide standards and/or codes of practice as may seem appropriate for meat hygiene, excluding poultry meat.

CODEX COMMITTEE ON PROCESSED MEAT PRODUCTS

Host Government: Denmark

Terms of reference:

To elaborate world-wide standards for processed meat products, including consumer packaged meat, but not including poultry products.

CODEX COMMITTEE ON FISH AND FISHERY PRODUCTS

Host Government: Norway

Terms of reference:

To elaborate world-wide standards for fresh, frozen (including quick frozen) or otherwise processed fish, crustaceans and molluscs.

CODEX COMMITTEE ON FOODS FOR SPECIAL DIETARY USES

Host Government: Federal Republic of Germany

Responsibility:

To elaborate world-wide standards and general principles for foods for special dietary uses. Where it is not possible for the Committee to reach agreement of a world-wide standard, the Committee has authority to proceed with the elaboration of regional standards.

CODEX COMMITTEE ON EDIBLE ICES

Host Government: Sweden

Terms of reference:

To elaborate world-wide standards as appropriate for all types of edible ices, including mixes and powders used for their manufacture.

B. REGIONAL COMMITTEES

Joint ECE/Codex Alimentarius Group of Experts on Standardization of Quick Frozen Foods

Terms of reference:

The Joint ECE/Codex Alimentarius Group of Experts on the Standardization of Quick Frozen Foods will be responsible for the development of standards for quick frozen foods in accordance with the General Principles of the Codex Alimentarius. The Joint Group will be responsible for general considerations, definitions, a framework of individual standards for quick frozen food products and for the actual elaboration of standards for quick frozen food products not specifically allotted by the Commission to another Codex Committee, such as Fish and Fishery Products, Meat, Processed Meat

Products, and Poultry and Poultry Meat Products. Standards drawn up by Codex Commodity Committees for quick frozen foods should be in accordance with the general standard laid down by the Joint ECE/Codex Alimentarius Group of Experts on the Standardization of Quick Frozen Foods and should, at an appropriate stage, be referred to it for coordination purposes.

Joint ECE/Codex Alimentarius Group of Experts on Standardization of Fruit Juices

Responsibility:

To elaborate world-wide standards for fruit juices.

NOTE: The above two Groups of Experts are not subsidiary bodies under any specific rules of the Codex Alimentarius Commission but follow the same procedure as Codex Commodity Committees for the elaboration of Codex standards.

CODEX COMMITTEE ON NATURAL MINERAL WATERS

Host Government: Switzerland

To elaborate regional standards for natural mineral waters.

FAC/WHO COORDINATING COMMITTEE FOR EUROPE

Membership:

This Committee is open to all Member Governments of FAO and/or WHO within the geographic area of Europe, including Israel, Turkey and the U.S.S.R., and its Chairman is, ex officio, the Coordinator for Europe.

Functions:

The Committee exercises general coordination in the preparation of standards relating to the region of Europe and exercises such other functions as may be entrusted to it by the Codex Alimentarius Commission.

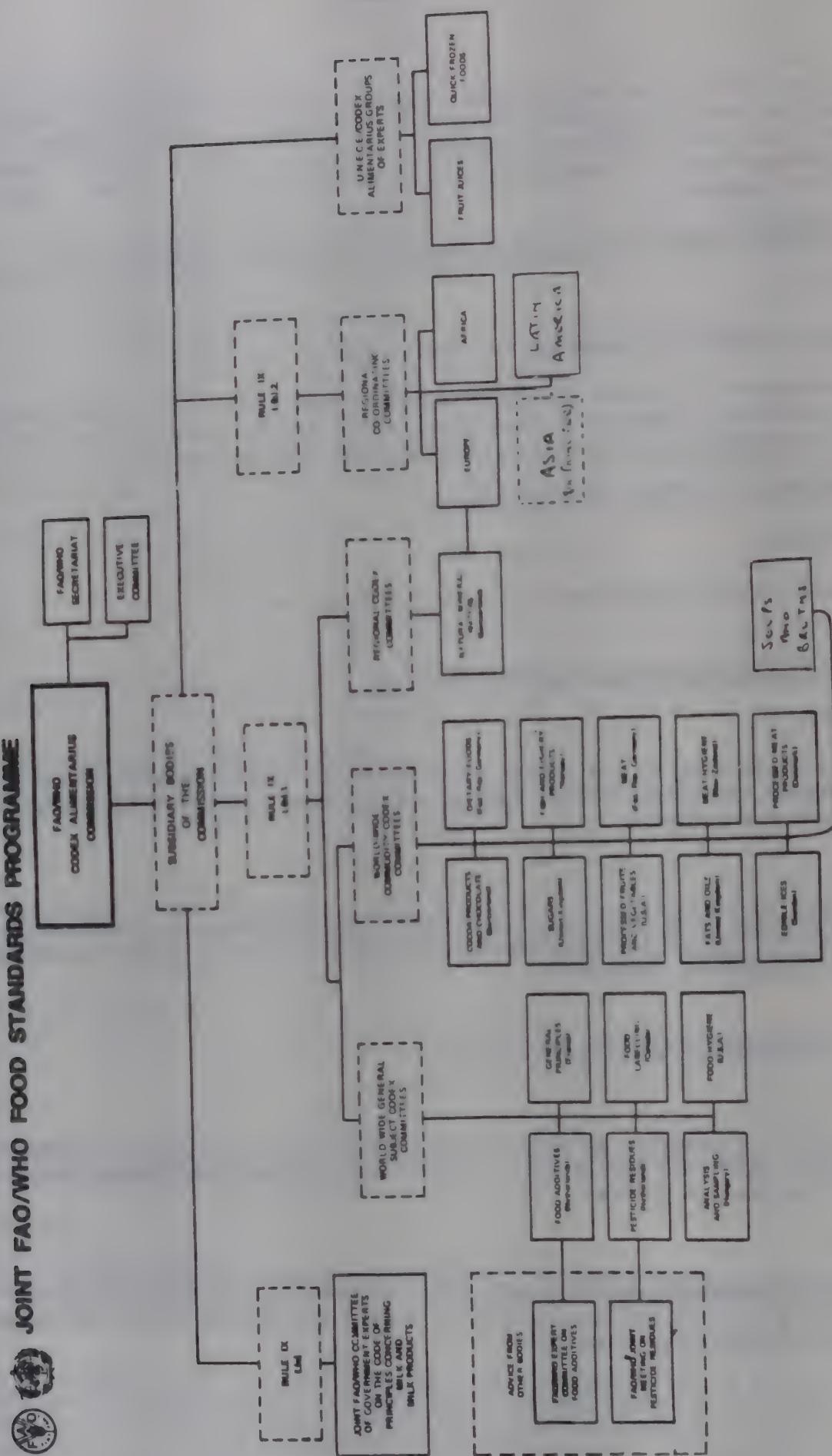
FAO/WHO COORDINATING COMMITTEE FOR AFRICA

Membership:

Membership of the Committee is open to all Member Nations and Associate Members of FAO and/or WHO which are members of the Codex Alimentarius Commission, within the geographic location of Africa.

Functions:

The Committee exercises general coordination in the preparation of standards relating to the region of Africa and exercises such other functions as may be entrusted to it by the Codex Alimentarius Commission.



## APPENDIX XII

### Case study of a Food Quality Control Project - Saudi Arabia

The Government of Saudi Arabia (Ministry of Commerce and Industry) requested in 1967 the technical assistance of FAO for a Food Quality Control project in the country under a Funds-in-Trust arrangement. Saudi Arabia imports most of its food, which comes from all over the world, mainly through the ports of Jeddah and Damman.

In consultation with the Government of Saudi Arabia the FAO made arrangements to employ under a subcontract the Central Food and Nutrition Research Institute TNO Zeist (Netherlands), for the operation of the project.

The main objective of the project included the setting up of two quality control laboratories (Jeddah and Damman) and the assisting in their operation by training Saudi chemists, food inspectors and other technical staff. The project also included drafting of food standards, methods of analysis and sampling procedures.

The two laboratories were made operational during the first phase of the project, 1967-70, and, as a first step, are exercising control over imported foods.

Saudi chemists were sent to the Netherlands Institute for training. This training was further continued by the experts in Saudi Arabia. About sixty food standards were drawn up in accordance with recommendations of the Codex Alimentarius Commission and other international bodies. After suitable modifications were made to meet the Saudi Arabian conditions, they were recommended to the government. A number of standard methods of analysis were prepared for use within the laboratories. The project provided in two phases for 310 man/months of experts from FAO-TNO. These included specialists in food chemistry, microbiology, food inspection, administration and the establishment of laboratories.

### Case Study - Creation of a regional food reference laboratory

Guatemala forms part of the Central American Isthmus, which with an area of 488 710 square kilometers and a population of about 16 million, has witnessed significant economic progress since the formation in 1960 of the Central American Common Market. Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua are full members and Panama is an associate member. Among the industries stimulated by this development, the food industry occupies a central place in the industrial structure of Guatemala.

Two aspects of the food industry became of particular concern: the maintenance of standards of quality of food products to meet the regulations of importing countries and the protection of the health of the local population. Regulations promulgated under the Sanitary Code of Guatemala required registration of each variety of processed food and its analysis before it could be put on sale. This was not being strictly enforced due to inadequate laboratory facilities. They were unable to test foods for pesticide residues or to examine coffee for internal infestation - failure to test lots of meat and of coffee before exportation resulted in rejection of many lots with heavy losses.

The Ministers of Public Health of the six republics at their Ninth Meeting in 1964 adopted a recommendation that the Regional Food Reference Laboratory as a part of the Institute of Nutrition of Central America and Panama (INCAP) should serve as a central laboratory for the entire region for the registration of processed food products, while the national laboratories of each country should be reorganized so as to be able to deal with all types of fresh food.

Through PAHO/WHO the United Nations Development Programme (UNDP) was asked to assist in a project which involved the creation of a unified food control laboratory formed by uniting the Food Control and Analysis Division of INCAP and the Bromatological Laboratory of the Ministry of Public Health and Social Assistance of Guatemala.

To implement the project, the Guatemalan Government and the Pan American Health Organization (PAHO) and WHO through INCAP provided scientists, technicians and auxiliary and administrative staff for the Laboratory. They also provided a laboratory building, locally available laboratory equipment, and services, including the services of the Division of Statistics of the INCAP with its computer.

UNDP contributed funds for a project manager; for fellowships to train food chemists and microbiologists and for special training in instrumental techniques; and for expensive equipment.

This laboratory is now in operation, carrying out its objectives as a national food control laboratory, and as a regional reference laboratory for all Central American countries.

In addition, it is providing specialized laboratory services and training for laboratory staff of other Central American Countries, and is conducting analytical methodology research to standardize methods used in the area.

#### Case Study of a Complete Food and Drug Control Programme - Zambia

Immediately following Independence in 1964, officials of the Zambian Government tried to update their food control laws. These laws were based on the English Food and Drugs Act of 1955, and various related enactments. Though extensive work was done, these laws could not be amended to produce a modern food law suitable for Zambia. It was decided that a completely new Food and Drugs Act would be needed.

In 1969 the Government invited FAO to make a study of the existing food and drug laws and to suggest appropriate changes. An expert visited Zambia in 1969 and reported that the existing food and drug laws were inadequate, that there were few trained Zambians to enforce the law, and recommended that the food control system be strengthened materially. The Government of Zambia drew up a project proposal and requested assistance from FAO. FAO arranged for the implementation of the project through FAO/Government Cooperative Programmes, the funds being made available by the Government of Denmark (DANIDA).

#### **The Plan of Operation for the project provided for the following:**

**“1. Strengthening of the technical, organizational and international setup of food control services in the country, in accordance with the latest technological development and coordinating the activities of various agencies dealing with the rural development (agriculture), commerce, public health and customs in this field;**

#### **2. In particular:**

**a) a deeper survey of the existing food control service as set up within the Ministry of Health and implemented by local bodies with a view to making recommendations for its re-organization and more effective overall enforcement;**

**b) advising the Government of its food legislation and its implementation;**

**c) planning and setting up of one modern Central Food Control Laboratory in Lusaka and advising local bodies regarding the setting-up of their laboratories;**

**d) advising the Government in the drawing up of standards for various foods both imported and produced indigenously;**

- e) training of Zambian technical personnel in food analysis - physical, chemical and microbiological - and preparation of laboratory reports;
- f) adopting suitable methods for sampling and analysis of foods."

The project which began in May 1971 involved the services of four experts, two associate experts and two consultants, in the fields of chemical and microbiological analysis of foods, the drafting of food law and regulations, food inspection, training and overall development of the food control service.

A comprehensive food and drug law was enacted; regulations were drafted to establish food standards, to place limitations on food additives and pesticide residues in food; to control labelling; and for general administration of the Act. A fully equipped Central Food and Drug Laboratory was established and provisions made for training the staff.

Three graduate Zambian chemists and a pharmacist were selected for post-graduate training in the United Kingdom and Australia. In addition, training of other recent graduates from the University of Zambia was carried out at the Project site in Lusaka along with the training of laboratory technicians.

Fortunately, Zambia already had on the job public health inspectors capable of collecting samples and handling other inspection assignments under the new Act. Plans included development of a detailed Inspectors' Manual for their guidance. These public health inspectors after graduation completed a further course on the inspection of meats and other foods, and received diplomas for this course.

### GLOSSARY OF TERMS

For the purpose of these guidelines, the words or phrases have the meaning assigned to them. These definitions should not be considered as official or definitive. They are taken chiefly from FAO/WHO publications particularly:

Food and Nutrition Terminology  
Terminology Bulletin No. 28, FAO/WHO, 1974.

Procedural Manual Codex Alimentarius Commission, "Definitions for the Purposes of Codex Alimentarius". These definitions are subject to review and possible revision from time to time.

Reports of various FAO/WHO Expert Committees.

adulteration

- see food adulteration

aflatoxins

- mycotoxins produced by the growth of the mould Aspergillus flavus on many foods such as groundnuts, certain grain and cottonseed meal under favorable conditions of heat and moisture. Aflatoxins are potent producers of liver cancers in some animals, and possibly in man.

article.

- includes:

(a) any food and any labelling or advertising materials in respect thereof; or

(b) anything used for the preparation, preservation, packing or storing of any food.

authorized officer

- means any suitably qualified person authorized in writing for the purposes of enforcement of a food act; and

(a) for the purposes of taking samples, sending them for analysis and necessary reports thereon; and

(b) for the purposes of legal proceedings under the food act.

carcinogenicity

- the power, ability or tendency to produce cancer.

certificate of free sale

- a certificate signed by a competent official stating that a food complies with the food laws and regulations of the country of origin and enjoys "free sale" within that country.

Codex tolerance; or  
Codex maximum residue limits

- is the maximum concentration of a pesticide residue that is recommended by the Codex Alimentarius to be legally permitted in or on a food or food commodity. The concentration is expressed in parts by weight of pesticide residue per million parts by weight of the food or food commodity.

component

- any substance which forms part of an "ingredient".

container

- any form of packaging of food for sale as a single item, whether by completely or partially enclosing the food and includes wrappers.

food adulteration

- although laws include different definitions of food adulteration, it is generally used to indicate the deliberate addition to a food of a cheaper or less nutritive substance or the abstraction from a food of a valuable constituent, sometimes with replacement of this by an inferior substance.

food advertisement

- includes any representation by any means whatsoever for the purpose of promoting directly or indirectly, the sale or disposal of any food or any substance represented as a food.

food for special dietary uses

- a food which is distinguished from ordinary foods by its special composition and/or by its physical, chemical, biological or other modifications resulting from processing. For this reason it meets the particular nutritive needs of persons whose normal processes of assimilation or metabolism have become modified or for whom a particular effect is to be obtained by a controlled intake of foods. It is a food not a medicine.

food handling

- the sum of processes and treatments to which food is subjected from its production until its final consumption.

food hygiene

- the measures whereby the wholesomeness, soundness and safety for human consumption are secured of increased, covering all facets of food production, harvesting, processing, distribution, preparation, and service and of possible causes of toxicity (physical, chemical or microbiological).

food irradiation

- treatment of food with ionising radiations such as fast electrons or gamma rays primarily to achieve extension or storage-life by inhibition of microbial growth or suppression of physiological processes such as ripening and sprouting. It also refers to the disinfestation of grains by exposure to ionising radiation. Sterilization is sometimes applied to sterilisation by irradiation.

food poisoning

- harmful effects following ingestion of food resulting from (i) contamination with pathogenic bacteria, (ii) toxic products of fungi and bacteria, (iii) allergic reaction to certain proteins or other components of food, or (iv) chemical contaminants.

food sanitation

- the body of environmental sanitation measures whereby food hygiene is ensured.

Note: this term tends to relate specifically to those aspects of food hygiene having to do with the cleanliness of premises and equipment used in the processing, handling, and storage of food and often includes aesthetic features of service environment. In practice, however, the terms "food sanitation" and "food hygiene" have often been used as synonyms.

food science

- the study and application of knowledge of the physical, chemical, economical and biological (including nutritional) properties of foods and their constituents, and the changes they undergo through handling, preservation, processing, storage, distribution and service.

food standards

- a body of rules or legislation, defining certain criteria - such a composition, appearance, freshness, source, sanitation, maximum bacterial count, purity, and maximum concentration of additives - which food must fulfil to be suitable for distribution or sale.

food technology

- the application of science and technology in the efficient and effective utilization of foods to ensure that they are made as fully available as possible and to maintain or increase their nutritional value and to improve or modify their appearance, palatability and sensory characteristics.

fortification (of foods)

- the addition of nutrients to foods to maintain or improve the quality of the diet of a group, a community, or a population. In most countries, the terms "enrichment" and "fortification" are often used synonymously.

good agricultural practices in the use of pesticides

- is defined as the officially recommended or authorized usage of pesticides under practical conditions at any stage of production, storage, transport, distribution and processing of food and other agricultural commodities, bearing in mind the variations in requirements within and between regions, and which takes into account the minimum quantities necessary to achieve adequate control, applied in a manner so as to leave a residue which is the smallest amount practicable and which is toxicologically acceptable.

heat process

- is the treatment of sealed containers of food with sufficient heat to destroy or inactivate all microorganisms that will grow at any temperature at which the product is likely to be held and which cause spoilage or might be harmful. A particular heat process is usually described as the length of time the particular product should be exposed to a specified temperature to accomplish the purpose.

ingredient

- any substance, including a food additive, used in the manufacture or preparation of a food and present in the final product.

irradiated foods

- foods which have been treated with ionizing radiation (see food irradiation).

insanitary conditions

- such conditions or circumstances as might cause contamination of a food with dirt or microbiological contamination or might render the same injurious or dangerous to health.

judicidial branch of the government

- that branch of a government which interprets the law, adjudicates cases, and assesses penalties for violations and includes all courts and magistrates.

label

- includes any tag, brand, mark, pictorial or other descriptive matter, written, printed, stencilled, marked, embossed or impressed on, or attached to, a container of food.

labelling

- includes the label and any written, printed or graphic matter relating to and accompanying the food.

licensing of food establishment

- the process by which appropriate food control authorities, local or national issue licences to operators of food establishments which have complied with relevant legal requirements. The licence authorizes the establishment to operate for a specified period of time, after which renewal is required. Licences may be suspended or revoked as provided for in the law.

legislative branch of government

- that branch of a government empowered to make, amend or repeal laws.

malnutrition

- a pathological state, general or specific, resulting from a relative or absolute deficiency or an excess in the diet of one or more essential nutrients. It may be clinically manifest or detectable only by biochemical and physiological tests.

microbiological contamination

- the presence in or on food of pathogenic microorganisms or of toxins produced by microorganisms which are present in or on such food as a result of the production, manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such food.

microbiological standard

- a microbiological criterion, incorporated in a law or regulation, controlling foods produced, processed, or stored in, or imported into, the area of jurisdiction of the regulatory agency.

mutagenicity

- the property of being able to induce genetic mutation, i.e. a permanent transmissible change in the characters of an offspring from those of its parents.

mycotoxins

- substances formed by mould growths on various seeds and other food or feed crops. Mycotoxins often cause toxic diseases in animals and may possibly affect humans.

nutrient

- any of the organic and inorganic compounds and elements contained in foods and which are utilized in the normal metabolism of the body. Nutrients are generally classified as carbohydrates, fats, proteins, vitamins, minerals, and other metabolizable organic compounds (organic acids, alcohols, etc.)

nutrition

- the processes whereby living organisms utilize food for maintenance of life, growth, the normal functioning of organs and tissues, and the production of energy; or the science and study of the reactions of the body to intake of food, to variations in the diet, and to other factors of pathological or systematic significance.

package

- includes anything in which any food is wholly or partly placed or packed, and includes any basket, pail, tray or receptacle of any kind whether open or closed.

pesticide

- means any substance or mixture of substances intended for preventing or controlling any pest and includes any substance or mixture of substances intended for use as a plant-growth regulator, defoliant or desiccant. It excludes fertilizers and antibiotics or other chemicals administered to animals for other purposes such as to stimulate their growth or to modify their reproductive behaviour.

pesticide residue

- means any substance or substances in food for man or animals resulting from the use of a pesticide. It also includes any specified derivatives, such as degradation and conversion products, metabolites and reaction products which are considered to be of toxicological significance.

practical residue limits

- maximum levels designated as "practical residue limits" are intended to control pesticide residues resulting from circumstances not designed to protect the food against pest attack. The residue may be acquired at any stage in the growing, harvesting, distribution, marketing or processing of the food. Therefore, such pesticides are not being recommended for direct application to the foods to which these limits apply.

premises

- include:

(a) any building or tent or other structure permanent or otherwise, together with the land on which the same is situated and any adjoining land used in connection therewith, and includes any vehicle, conveyance or vessel; and

(b) shall include any street, open space or place of public resort, bicycle or other vehicle used for the preparation, preservation, packaging, storage or conveyance of any article.

prepackaged

- packaged or made up in advance, ready for retail sale in a container.

public analyst

- means a suitably qualified chemist or microbiologist legally appointed to examine samples of foods for compliance with standards or food laws.

retort

- is a pressure vessel designed for heat processing food packed in hermetically sealed containers, either by saturated steam or by heated water with superimposed air pressure.

registration of food establishments

- the process by which food control authorities, local or national, maintain registers in which is entered information which applicants must supply before they may operate. This information should include the name and address of the establishment and other relevant data.

The approval of premises may be required before registration, however, this practice is not universal. Registration is usually for an indefinite period of time, subject to cancellation for causes indicated in the law.

sell

- includes offer, advertise, keep, expose, transit, convey, deliver or prepare for sale or exchange, dispose of for any consideration whatsoever or transmit, convey or deliver in pursuance of a sale, exchange or disposal as aforesaid.

teratogenicity

- the property of being able to produce physical defects in offspring in utero.

undernutrition

- a pathological state arising from an intake of an inadequate amount of food, and hence of calories, over a considerable period of time, with reduced body-weight as its principal manifestation.

wholesome food

- as used with food, pertaining to a positive impression of its quality combining such notions as harmless or safe to eat; vaguely good in a nutritional sense, free of blemishes; undefiled by insects; filth or decay in storage, processing and handling; sometimes without a treatment or additive.

zoonoses

- those diseases and infections which are naturally transmitted between vertebrate animals and man.



BIBLIOGRAPHY

The main heads under which the publications are grouped are:-

- Analytical methods and sampling procedures
- Irradiated foods and radioactive contamination
- Consumer education
- Dairy products, hygiene and quality control
- Food additives
- Foods general
- Historical aspects - foods general
- Hygiene general
- Laboratories, planning, design and equipment
- Legislation
- Meat hygiene and inspection
- Nutrition
- Pesticides
- Sea foods, hygiene and quality control

In addition to the above groups, Item 6 - Food General - is divided into appropriate groups of known relevant publications which do not conveniently fit elsewhere. No cross reference has been provided and when a publication cannot be located within a particular group, it may possibly be found in a related group, if the publication itself deals with more than one aspect. Border line cases often appear and a check on related groups may be profitable.

ANALYTICAL METHODS AND SAMPLING PROCEDURES

A. FAO/WHO Publications

1960 Codex Alimentarius Commission  
Sampling Plans for Prepackaged Foods  
CAC/RM No. 42 - 1969, 15 p. FAO

1970 Methods of Analysis for Processed Fruits and Vegetables  
CAC/RM Nos. 36/39 - 1970, 12 p. FAO

1970 Methods of Analysis for Quick-Frozen Fruits and Vegetables  
CAC/RM Nos. 32/33 - 1970, 12 p. FAO

1970 Methods of Analysis for Sugars  
CAC/RM Nos. 1/8 - 1970, 29 p. FAO

1972 Recommended International Standard Procedures for Thawing  
of Quick-Frozen Fruits and Vegetables and Cooking of  
Quick-Frozen Vegetables for Examination Purposes  
CAC/RM Nos. 32/33 - 1972, 9 p. FAO

1973 Code of Principles Concerning Milk and Milk Products,  
International Standards and Standard Methods of Sampling  
and Analysis for Milk Products 7th Edition  
CAC/M No. 1 - 1973, 127 p. FAO

B. General Publications

1970 Assoc. of Official Analytical Chemists; Horwitz  
Official Methods of Analysis 11th Edition  
A.O.A.C., P.O.Box 540  
Benjamin Franklin Station, Washington D.C.

1970 Pearson, D. The Chemical Analysis of Food 6th Edition  
J.A. Churchill, 104 Gloucester Place, London

B. General Publications (cont'd)

1972      Couston and Keorte - Environmental Quality and Safety  
              Vols I & II  
              Academic Press Inc., New York, N.Y.

              Joslyn, M.R. - Methods in Food Analysis  
              Academic Press Inc., New York, N.Y.

1973      Guy, K. - Laboratory Organization & Administration 2nd Edition  
              Butterworth & Co. Ltd., 88 Kingsway, London

              International Federation of Fruit Juice Producers  
              Collection of the Methods of Analysis  
              Swiss Fruit Union, Baaraster 88, Ch-6300  
              Zug. 2. Switzerland

              Office International de la Vigne et du Vin  
              Recueil des Méthodes Internationales d'Analyse des Vins  
              11, Rue Roquépine, Paris

              American Oil Chemists Society  
              Official and Tentative Methods of the American Oil Chemists  
              Society 2nd Edition  
              Chicago, Illinois

1958      British Standards Institution  
              Standards 684: 1958. Methods of Analysis of Oils and Fats  
              British Standards Hq : 2, Park St., London W.I.

              International Commission for Uniform Methods of Sugar Analysis  
              Uniform Methods of Sugar Analysis

1958      Report of 12th Session Washington

1962      "        " 13th     "     Hamburg

1966      "        " 14th     "     Copenhagen

              ICUMSA, 23, Avenue D'Lena, Paris 16ème

1964      International Commission for Uniform Methods of Sugar Analysis  
              Methods of Sugar Analysis  
              UCS de Whalley, Elsevier Publishing Co., Amsterdam/London/New York

B. General Publications (cont'd)

1968 Thatcher, F.S.; Clark, D.S. - Microorganisms in Food :  
Their Significance and Methods of Enumeration  
University of Toronto Press

1966 International Union for Pure and Applied Chemistry  
Standard Methods of the Oil and Fats Section with Supplements  
5th Edition  
Butterworth & Co. Ltd., 88 Kingsway, London, W.I.

1967 Thieulin Q. and Vuillaumer, R. - Elements Pratiques et d'Inspection  
du Lait, des Produits Laitiers et des Oeufs 3rd Edition  
Le Lait, Revue Générale des Questions Laitières, Paris

(i) Inspection and Sampling

1965 Cochran, W.G. - Sampling Techniques 2nd Edition

1967/8 Herschdoerfer S.M. (Ed) - Quality Control in the Food Industry  
Three volumes

1965 Huitson, A. and Keen J. - Essentials of Quality Control

1962 Juran, J.M. et al (Editor) - Quality Control Handbook 2nd Edition

1962 Kramer, A. and Twigg, B.A. - Fundamentals of Quality Control in  
the Food Industry

1969 Martin, C.R.A. - Practical Food Inspection 7th Edition

1960 Society of Chemical Industry - Quality Control of Food  
(Sci Monograph No. 8)

(ii) Sensory Evaluation of Food Quality

1968 American Society for Testing and Materials  
Basic Principles of Sensory Evaluation of Food (STP 433)

1966 Principles of Sensory Evaluation of Food

1968 Manual on Sensory Testing Methods

1968 Correlation of Subjective-Objective Methods in the Study of Odours  
and Tastes

B.

General Publications (cont'd)

1960

Association of Public Analysts (U.K.)

Separation and Identification of Food Colours

1966

Association Vitamin Chemists (U.S.A.)

Methods of Vitamin Assay 3rd Edition

Food & Drug Administration U.S.A.

Analytical Methods in Food and Drug Control (Bulletin No. 1)

Washington

1961

International Association of the Broth & Soup Industry

Analytical Methods for the Soup Industry

1963

Society for Analytical Chemistry - Official, Standardized and  
Recommended Methods

1967

and Supplement

1966

Harrigan, W.F. and McCance, M.E. - Laboratory Methods in Microbiology

Academic Press, London & New York

C.

Periodicals

- Analyst
- Analytical Abstracts
- Analytical Chemistry
- Journal of the Association of Official Analytical Chemists  
(formerly Journal of the Association of Official Agricultural Chemists)
- Journal of the Association of Public Analysis
- Laboratory Practice
- Methods of Biochemical Analysis

## IRRADIATED FOODS AND RADIOACTIVE CONTAMINATION

#### A. FAO/WHO Publications

1959	Methods of Radiochemical Analysis: Report of a Joint FAO/WHO Expert Committee - FAO Atomic Energy Series No. 1, 116 p.	FAO
1960	Radioactive Materials in Food and Agriculture: Report of an FAO Expert Committee 30 Nov - 11 Dec 1959 - Rome FAO Atomic Energy Series No. 2, 123 p.	FAO
1962	Organization of Surveys for Radionuclides in Food and Agriculture - FAO Atomic Energy Series No. 4, 103 p.	FAO
1966	The Technical Basis for Legislation on Irradiated Foods: Report of a Joint FAO/IAEA/WHO Expert Committee - April 1964 - Rome; WHO Technical Report Series 316; FAO Atomic Energy Series No. 6, 56 p.	FAO WHO
1968	Freezing and Irradiation of Fish: Papers and Discussions of the Technical Conference on the Freezing and Irradiation of Fish - Madrid 1967 - No. 03159-68 53/E, 59 p.	FAO
1970	Wholesomeness of Irradiated Foods with Special Reference to Wheat, Potatoes and Onions. Report of a Joint FAO/IAEA/WHO Expert Committee - Geneva 1969 - WHO Technical Report Series No. 451, 44 p.	WHO

## B. General Publications

1962 International Atomic Energy Agency - Use of Radioisotopes in Animal Biology and Medical Sciences

1966 Mann, W.B. and Garfinkel, S.B. - Radioactivity and its Measurement

B. General Publications (cont'd)

1964 Ministry of Health (UK) - Report of the Working Party on the Irradiation of Food

1960 Overman, R.T. and Clark, H.M. - Radioisotop Techniques

1958 Singleton, W.R. (Editor) - Nuclear Radiation in Food and Agriculture

1953 Spear, F.G. - Radiation and Living Cells

1965 Business and Defence Services Administration -  
Current Status and Commerical Prospects for the Radiation  
Preservation of Food  
U.S. Department of Commerce

CONSUMER EDUCATION

A. FAO/WHO Publications

1956 Clements, F.W. - Report of an International Seminar on Education in Health and Nutrition, Baguio, Philippines 13 Oct - 3 Nov 1955; 1958 2nd Edition FAO  
FAO Nutrition Meetings Report Series No. 13, 92 p.

1960 Joint WHO/UNESCO Committee on Teacher Preparation for Health Education. WHO Technical Report Series No. 193, 19 p. WHO

1964 PAHO/WHO Inter-Regional Conference on the Post-Graduate Preparation of Health Workers for Health Education. WHO Technical Report Series No. 278, page 30 WHO

1971 Holmes, A.C. - Visual Aids in Nutrition Education: A Guide to their Preparation and Use - 3rd Printing (E) Monograph Series, 154 p. FAO

1971 Ritchie, J.A.S. - Learning Better Nutrition: A Second Study of Approaches and Techniques - FAO Nutritional Studies No. 20, 264 p. FAO

1971 Food and Nutrition Education in the Primary School: A Guide for its Introduction - FAO Nutritional Studies No. 25, 107 p. FAO

B. General Publications

1964 Holmes, A.C. - Health Education in Developing Countries Thos Nelson Ltd., London and Edinburgh

1968 Department of Education (UK) - A Handbook of Health Education - HMSO, London

1969 Presidents Committee Consumer Education - Consumer Education Bibliography - US Government Printers

DAIRY PRODUCTS, HYGIENE AND QUALITY CONTROL

A. FAO/WHO Publications

1953 Kay, H.D. - Milk Pasteurization: WHO Monograph Series No. 14 - FAO Agricultural Studies No. 23, 204 p. FAO WHO

1957 Joint FAO/WHO Expert Committee on Milk Hygiene: First Report. WHO Technical Report Series No. 124, 54 p. WHO

1960 Joint FAO/WHO Expert Committee on Milk Hygiene: Second Report. WHO Technical Report Series No. 197, 55 p. WHO

1962 Abdussalm, M. - Milk Hygiene. WHO Monograph Series No. 48, 782 p. WHO

1963 Hall, H.S., Rosen, Y. and Blombergsson H. - Milk Plant Lay Out - FAO Agricultural Studies No. 59, 159 p. FAO

1965 Burton, H. - Milk Sterilization - FAO Agricultural Studies No. 65, 265 p. FAO

1967 Seehafer, M.E. - The Development and Manufacture of Sterilized Milk Concentrate - FAO Agricultural Studies No. 72, 52 p. FAO

1968 WHO Expert Committee on the Microbiological Aspects of Food Hygiene Report. WHO Technical Report Series No. 399, 64 p. WHO

1970 Joint FAO/WHO Expert Committee on Milk Hygiene: Third Report: FAO Agricultural Studies No. 83; WHO Technical Report Series No. 453, 82 p. FAO WHO

B. General Publications

1967 Walter, W.G. - Standard Methods for the Examination of  
Dairy Products - 12th Edition  
American Public Health Associations, New York

1967 Whyte, R.O. - Milk Production in Developing Countries  
Faber and Faber; London

FOOD ADDITIVES

A. FAO/WHO Publications

1957	General Principles Governing the Use of Food Additives First Report - FAO Nutrition Meetings Report Series No. 15, 22 p. - WHO Technical Report Series No. 129	FAO WHO
1958	Procedures for the Testing of International Food Additives to Establish their Safety for Use. Second Report - FAO Nutrition Meetings Report Series No. 17, 19 p. - WHO Technical Report Series No. 144	FAO WHO
1962	Specifications for Identity and Purity of Food Additives Vol I (Antimicrobial Preservatives and Antioxidants)	FAO
1961	Evaluation of the Carcinogenic Hazards of Food Additives Fifth Report - FAO Nutrition Meetings Report Series No. 29, 33 p. - WHO Technical Report Series No. 220	FAO WHO
1963	Specifications for Identity and Purity of Food Additives Vol II (Food Colours)	FAO
1962	Evaluation of the Toxicity of a Number of Antimicrobials and Antioxidants, Sixth Report - FAO Nutrition Meetings Report Series No. 31, 104 p. - WHO Technical Report Series No. 228	FAO WHO
1963	Second Joint FAO/WHO Conference on Food Additives Report FAO Nutrition Meetings Report Series No. 34, 12 p.	
1963	Food Additive Control in the Federal Republic of Germany FAO Food Additive Control Series No. 7, 41 p.	FAO
1963	Food Additive Control in the Netherlands - FAO Food Additive Control Series No. 3, 41 p.	FAO

A. <u>FAO/WHO Publications (cont'd)</u>		
1964	Specifications for the Identity and Purity of Food Additives and their Toxicological Evaluation: Emulsifiers, Stabilizers, Bleaching and Maturing Agents. Seventh Report - FAO Nutrition Meetings Report Series No. 35, 189 p. - WHO Technical Report Series No. 281	FAO WHO
1965	Food Additive Control in France FAO Food Additive Control Series No. 6, 69 p.	FAO
1965	Specifications for the Identity and Purity of Food Additives and their Toxicological Evaluation: Food Colours and Some Antimicrobials and Antioxidants. Eighth Report. FAO Nutrition Meetings Report Series No. 38, 25 p. - WHO Technical Report Series, No. 309	FAO WHO
1965	Specifications for Identity and Purity and Toxicological Evaluation of Some Antimicrobials and Antioxidants. FAO Nutrition Meetings Report Series, No. 38A; - WHO/Food Add/24.65	FAO WHO
1966	Specifications for Identity and Purity and Toxicological Evaluation of Food Colours. FAO Nutrition Meetings Report Series No. 38B; WHO/Food Add/66.25	FAO WHO
1966	Specifications for the Identity and Purity of Food Additives and their toxicological evaluation: some antimicrobials, anti-oxidants, emulsifiers, stabilizers, flour-treatment agents, acids and bases: Ninth Report. FAO Nutrition Meetings Report Series No. 40, 24 p. - WHO Technical Report Series No. 339	FAO WHO
1967	Specifications for the Identity and Purity of Food Additives and their Toxicological Evaluation: Some Emulsifiers and Stabilizers and Certain other Substances, Tenth Report. FAO Nutrition Meetings Report Series No. 43, 47 p.; WHO Technical Report Series, No. 373	FAO WHO

A. FAO/WHO Publications (cont'd)

1967 Toxicological Evaluation of Some Antimicrobials, FAO  
Antioxidants, Emulsifiers, Stabilizers, Flour-treatment WHO  
Agents, Acids and Bases. FAO Meetings Report Series No. 40A,  
B, C; WHO/Food Add/67.29

1968 Specifications for the Identity and Purity of Food Additives FAO  
and their Toxicological Evaluation: Some Flavouring Sub- WHO  
stances and Non-Nutritive Sweetening Agents. Eleventh  
Report. FAO Nutrition Meetings Report Series No. 44, 18 p; WHO  
Technical Report Series No. 383

1968 Toxicological Evaluation of Some Flavouring Substances and FAO  
Mon-Nutritive Sweetening Agents. FAO Nutrition Meetings WHO  
Report Series, No. 44A; WHO/Food Add/68.33.

1969 Specifications and Criteria for Identity and Purity of Some FAO  
Flavouring Substances and Non-Nutritive Sweetening Agents. WHO  
FAO Nutrition Meetings Report Series, No. 44B; WHO/Food  
Add/69.31

1969 Food Additive Control in the USSR FAO  
FAO Food Additive Control Series No. 8, 45 p.

1969 Specifications for the Identity and Purity of Food Additives FAO  
and their Toxicological Evaluation: Some Antibiotics. WHO  
Twelfth Report. FAO Nutrition Meetings Report Series No. 45,  
49 p.; WHO Technical Report Series No. 430

1969 Specifications for the Identity and Purity of Some Anti- FAO  
biotics. FAO Nutrition Meetings Report Series No. 45A; WHO  
WHO/Food Add/69.34

1970 Specifications for the Identity and Purity of Food Additives FAO  
and their Toxicological Evaluation: Some Food Colours, WHO  
Emulsifiers, Stabilizers, Anticaking Agents, and Certain  
other Substances. Thirteenth Report. FAO Nutrition Meetings  
Report Series No. 46, 31 p; WHO Technical Report Series  
No. 445

A. <u>FAO/WHO Publications (cont'd)</u>			
1970	Toxicological Evaluation of Some Food Colours, Emulsifiers Anticaking Agents and Certain other Substances. FAO Nutrition Meetings Report Series No. 46A; WHO/Food Add/70.36	FAO	WHO
1970	Specifications for the Identity and Purity of Some Food Colours, Emulsifiers, Stabilizers, Anticaking Agents and Certain other Food Additives. FAO Nutrition Meetings Report Series No. 46B; WHO/Food Add/70.37	FAO	WHO
1971	Evaluation of Food Additives. Specifications for the Identity and Purity of Food Additives and their Toxicological Evaluation; Some Extraction Solvents and Certain Other Substances; and a Review of the Technological Efficacy of Some Antimicrobial Agents. Fourteenth Report. FAO Nutrition Meetings Report Series No. 48, 36 p.; WHO Technical Report Series No. 462	FAO	WHO
1971	Toxicological Evaluation of Some Extraction Solvents and Certain other Substances. FAO Nutrition Meetings Report Series No. 48A; WHO/Food Add/70.39	FAO	WHO
1971	Specifications for the Identity and Purity of Some Extraction Solvents and Certain Other Substances. FAO Nutrition Meetings Report Series No. 48B; WHO/Food Add/70.40	FAO	WHO
1971	A Review of the Technological Efficacy of Some Antimicrobial Agents. FAO Nutrition Meetings Report Series, No. 48C; WHO/Food Add/70.41	FAO	WHO
1972	Evaluation of Food Additives. Some Enzymes, Modified Starches, and Certain Other Substances: Toxicological Evaluations and Specifications and a Review of the Technological Efficacy of Some Antioxidants, Fifteenth Report. FAO Nutrition Meetings Report Series, No. 50, 41 p.; WHO Technical Report Series No. 488	FAO	WHO

A. FAO/WHO Publications (cont'd)

1972 Toxicological Evaluation of Some Enzymes, Modified Starches and Certain Other Substances. FAO Nutrition Meetings Report Series No. 50A; WHO/Food Additives Series No. 1 FAO WHO

1972 Specifications for the Identity and Purity of Some Enzymes and Certain Other Substances. FAO Nutrition Meetings Report Series No. 50B; WHO Food Additives Series, No. 2 FAO

1972 A Review of the Technological Efficacy of Some Antioxidants and Synergists. FAO Nutrition Meetings Report Series No. 50C; WHO Food Additives Series, No. 3 FAC WHO

1972 Evaluation of Certain Food Additives and the Contaminants Mercury, Lead and Cadmium. Sixteenth Report. FAO Nutrition Meetings Report Series No. 51, 32 p.; WHO Technical Report Series No. 505 FAO WHO

1972 Evaluation of Mercury, Lead, Cadmium and the Food Additives Amaranth, Diethylpyrocarbonate and Octyl Gallate. FAO Nutrition Meetings Report Series No. 51A; WHO Food Additives Series No. 4 FAO WHO

1974 Toxicological Evaluation of Certain Food Additives with a Review of General Principles and Specifications. Seventh Report. Report of the Joint FAO/WHO Expert Committee on Food Additives. FAO Nutrition Meetings Report Series No. 53; WHO Technical Report Series No. 539 FAO WHO

B. General Publications

U.S. Government - Title 21. Code of Federal Regulations  
Part 121 Food Additives. U.S. Government Printing Service  
Washington D.C.

Committee of Specifications, Food Chemicals Codex of the  
Committee on Food Protection, National Council.  
Food Chemicals Codex, 2nd Edition  
National Academy of Science, Washington D.C.

1968 Furia, T.E. (Editor) - Handbook of Food Additives  
Chemical Rubben Co., 18901 Granwood Parkway, Cleveland, Ohio

1974 Council of Europe - Natural Flavouring Substances, their  
Sources and added Artificial Flavouring Substances  
Maisonneuve, 5 A, A Sainte-Ruffine (Moselle)

FOODS - GENERAL

A. FAO/WHO Publications

1959 Food Borne Infections and Intoxications. Report of an European Technical Conference: WHO Technical Report Series No. 184, 18 p. WHO

1963 Freedom from Hunger Campaign. FAO Agricultural Studies No. 11, Rome, 102 p. FAO

1965 The State of Food and Agriculture. Review of the Second Post War Decade FAO

1970 Hall, D.W. - Handling and Storage of Food Graines in Tropical and Subtropical Areas. FAO Agricultural Development Papers No. 90, 350 p. FAO

1973 Joint FAO/WHO Standards Programme. Report on the Regional Conference for Africa CX/Africa 73/9, 30 p. FAO

1970 Adler P. - Flourides and Human Health - WHO Monograph Series No. 59, 364 p. WHO

B. General Publications

1956 Daok, G.M. - Food Poisoning, 3rd Edition University of Chicago Press

1966 National Academy of Science - Toxicants Occuring Naturally in Foods - National Research Council, Washington D.C.

Borgstrom, G. - Principles of Food Science Vol I and II Food Technology - The MacMillan Company, New York

Nikerson and Simskey - Microbiology of Foods and Food Processing American Elsevier Publishing Company, New York.

B. General Publications (cont'd)

Graham - The Safety of Foods. An International Symposium on the Safety and Importance of Foods in the Western Hemisphere  
The Avis Publishing Company Inc., West Port, Connecticut

1954 Clay H.H. - The Public Health Inspectors Handbook 8th Edition  
Lewis's London

1960 Thornton H. - The Inspection of Foods 2nd Edition  
Bailliere, Tindall and Cox, London

1963 Gunderson, F. & R., Ferguson, E. - Food Standards and Definitions. A Guidebook - Academic Press, New York and London

1969 Riemann, H. - Food Borne Infections and Intoxicants  
Academic Press, New York and London

Watt, B.K. and Merrill, A. L. - Composition of Foods  
Agricultural Handbook No. 8  
U.S. Department of Agriculture

(i) Alcoholic Beverages

1961 Amerine, M.A. and Cruess, W.V. - The Technology of Wine-making

1964 Burgess, A.H., Hops: Botany, cultivation and utilization

1968 Carr, J.G. - Biological Principles in Fermentation

1948 Jorgensen, A. revised Hansen, A. - Micro-organisms and Fermentation  
15th edition

1959 Mathias, P., The Brewery Industry in England, 1700-1830

1966 Monckton, H.A. - A history of English ale and beer

1949 Poulney, S.V. - Vinegar Products

1954 Preece, I.A. - The Biochemistry of Brewing

1959 Steel, R. (Ed) - Biochemical Engineering: Unit Processes in Fermentation

1954 Underkofler, L.A. and Hickey, R.J. (Eds) - Industrial Fermentations 2.v

1958 Whitmarsh, J.M. - British Fermentation Industries

B. General Publications (cont'd)

(ii) Catering and Institutional Feeding

1967 Fuller, J. - Catering Management in a technological age

1967 Ministry of Agriculture, Fisheries and Food - Dehydrated vegetables for the caterer. 3rd edition

1963 Platt, B.S., Eddy, T.P. & Pellett, P.L. - Food in hospitals: A study of feeding arrangements and the nutritional values of meals in hospitals

1966 West, B.B., Wood, L. & Harge, V.F. - Food Service in institutions, 4th edition

(iii) Cereals and Cereal Products

1962 American Association of Cereal Chemists - Cereal Laboratory Methods (now periodically revised as: Approved Methods of the AACC)  
7th edition

1946 Enzymes and their role in wheat technology (Monograph No. 1  
edited by J.A. Anderson)

1954 Storage of cereal grains and their products (Monograph No. 2  
edited by J.A. Anderson & A.W. Alcock)

Wheat Chemistry and Technology (Monograph No. 3)

1964 1st edition edited by H. Hlynka

1971 2nd edition edited by Y. Pomeranz

1973 Foreign & Commonwealth Office, Prevett, P.F. (Editor)  
Tropical Stored. Products Information. Special Issue.  
Ibadab Grain Storage Seminar, Tropical Products Institute, U.K.

B. General Publications (cont'd)

(iv) Food Processing

1965 Aiba, S., Humphrey, A.E. & Millis, N.F. - Biochemical Engineering

1967 Blakebrough, N. (Ed) - Biochemical and biological engineering science 2.v.

1969 Brennan, J.G. et al - Food engineering operations

1967 Buzzell, R.D. & Nourse, R.E.M. - Product innovation in food processing 1954-64

1963 Charm, S.E. - Fundamentals of food engineering

1957 Clarke, R.J. - Process engineering in the food industry

1962 Copson, D.A. - Micro-wave heating in freeze-drying, electric ovens and other applications

1964 Coulson, J.M. & Richardson, J.F. - Chemical engineering: - v.1, Fluid flow, heat and mass transfer - v.2, Unit operations 2nd edition

1963 Culpin, C. - Farm machinery 7th edition

1966 Earle, R.L., Unit operations in food processing

1963 Farrall, A.W. - Engineering for food and dairy products

1960 Hammond, R. - Separation and purification of materials

1963 Joslyn, M.A., Heid, J.L. (Eds) - Food processing operations: their management, machines, materials and methods 3.v.

1963 Little, A. & Mitchell, K.A. - Tablet making

(v) Food Products of Plant Origin

1970 Adams, P., Baker, J.J.W. & Allen, G.E. - The study of botany

1969 Ferwerda, F.P. & Wit, F. (Eds) - Outlines of perennial crop breeding in the tropics

1970 Garrett, S.D., Pathogenic root infecting fungi

1969 Harrison, S.G. et al (Illustrated by B.E. Nicholson) - The Oxford book of food plants

1957 Hughes, H.D. & Henson, E.R. - Crop Production

B. General Publications (cont'd)

(v) Food Products of Plant Origin

1969 Irvine, F.R. - West African crops  
1969 Janick, J., Schery, R.W., Woods, F.W. & Ruttan, V.W. -  
Plant science: an introduction to world crops  
1969 Ucko, P.J. & Dimbleby, G.W. (Eds) - The domestication and  
exploitation of plants and animals  
1960 White, R. - Crop production and environment

(vi) Inorganic Constituents of Food

1963 Aikawa, J.K. - The role of magnesium in biologic processes  
1966 Bowen, H.J.M. - Trace elements in biochemistry  
1960 Comar, C.L. & Bronner, F. (Eds) - Mineral metabolism: an advanced  
treatise  
1969 Eisenberg, D. & Kauzmann, W.J. - The Structural and Properties of Water  
1958 Lamb, C.A. et al (Eds) - Trace elements (Wooster, Ohio Conference)  
1965 Matz, S.A. - Water in Foods  
1949 Monier Williams, G.W. - Trace elements in food  
1966 Peisach, J., Aisen, P. & Blumberg, W.E. (Eds) - The biochemistry  
of copper  
1964 Schutte, K.H. - The biology of the trace elements: their role  
in nutrition  
1962 Underwood, E.J. - Trace elements in human and animal nutrition 2nd ed.  
1966 Underwood, E.J. - Mineral nutrition of livestock

(vii) Packaging and Packaging Materials

1970 Britt, K.W. (Ed) - Handbook of pulp and paper technology 2nd edition  
1969 Brydson, J.A. - Plastics materials  
1961 Day, F.T. - Packaging of Food  
1959 Buttray, D.N. - Plasticisers 2nd edition

B. General Publications (cont'd)

(vii) Packaging and Packaging Materials

1968 Paist, W.C. - Cellulosics  
1967 Paine, F.A. (Ed) - (Institute of Packaging) - Packaging Materials and containers  
1970 Sacharow, S. et al - Food Packaging: a guide for the supplier, processor and distributor

(viii) Yeasts and Edible Fungi

1958 Cook, A.H. (Ed) - The Chemistry and Biology of Yeasts  
1970 Gray, W.C. - The use of fungi as food and in food processing  
1967 Mills, A.K. - Aspects of Yeast Metabolism (Guinness Symposium)  
1966 Phaff, H.J., Miller, M.W. & Mrak, E.M. - Life of Yeasts: their nature, activity, ecology and relation to mankind  
1964 Singer, R. - Mushrooms and Truffles (World Crops Series)  
1962 White, J. - Yeast Technology - 2nd edition

C. Periodicals

- Journal of the Royal Society of Health, 13 Grosvenor Place, London
- Journal of the American Oil Chemists Society
- Journal of the Institute of Brewing (including abstracts section)
- British Journal of Nutrition
- Ceres
- FAO Freedom from Hunger Studies
- FAO State of Food and Agriculture
- Nutrition Abstracts and reviews
- Nutrition Reviews
- Proceedings of International Congresses of Nutrition
- Proceedings of the Nutrition Society
- Advance in Carbohydrate Chemistry
- Progress in the Chemistry of fats and other lipids

C. Periodicals (cont'd)

- Advances in Enzymology
- Advances in Protein Chemistry
- Advances in Vitamins and Hormones
- Annual Review of Biochemistry
- Archives of Biochemistry and Biophysics
- Biochemical Journal
- Journal of Agricultural and Food Chemistry
- Journal of Biological Chemistry
- Lipids
- Progress in Biophysics and Molecular Biology
- Baker's Digest
- Bakery Industries Journal (formerly Biscuit maker and plant baker)
- Cereal Chemistry
- Cereal Science To-day

HISTORICAL ASPECTS - FOOD GENERAL

General Publications

1784 Glasse, Mrs. H. - The Art of Cookery made plain and easy

1820 Accum, F.C. - A treatise on the art of Brewing

1821 Accum, F.C. - Culinary Chemistry

1820 Accum, F.C. - Treatise on the adulteration of foods - 2nd edition

1821 Accum, F.C. - Treatise on the art of making good and wholesome bread

1847 Amicus Curiae (pseud) - Food for the million: maize against potato

1855 Hassall, A. - Food and its adulterations - reports of the Analytical Sanitary Commission of the Lancet for the years 1851-54

1861 Hassall, A. - Adulterations detected or plain instructions for the discovery of frauds in food and medicine - 2nd edition

1850 Hassall, A. - Microscopic examination of water supplied to the inhabitants of London

1886 Jago, W. - The Chemistry of Flour and Bread and the Technology of Breadmaking

1848 Mitchell, J. - A treatise on the falsification of food and the chemical means employed to detect them

1781 Parmentier, A.A. - Recherches sur les vegetaux mourissant, qui dans les temps de disette, peuvent remplacer les aliments ordinaires

1863 Smith, Edward - Report to the Privy Council on the dietary of low-fed populations especially in reference to the agricultural areas in England and Wales, Scotland and Ireland

1934 Filby, F.A. - A History of Food Adulteration and Analysis

HYGIENE - GENERAL

A. FAO/WHO Publications

1954      Expert Committee on Environmental Sanitation, Third Report      WHO  
WHO Technical Report Series No. 77, 25 p.

1959      Expert Committee on Hygiene and Sanitation in Aviation.      WHO  
First Report. WHO Technical Report Series No.174, 51 p.

1960      Guide to Hygiene and Sanitation in Aviation - Environmental      WHO  
Health , 51 p.

1967      Lamoureux, V.B. - Guide to Ship Sanitation, 119 p.      WHO

1971      Assar, M.M. - Guide to Sanitation in National Disasters      WHO  
135 p.

1972      Health Hazards of the Human Environment - Prepared by      WHO  
150 Specialists, 387 p.

B. General Publications

Guthrie, R.K. - Food Sanitation  
Avi Publishing Co. Inc., West Point Connecticut

LABORATORY, PLANNING DESIGN AND EQUIPMENT

A. FAO/WHO Publications

1959 Public Health Laboratory Service. First Report of the Expert WHO Committee on Health Laboratory Methods. WHO Technical Report Series No. 128, 20 p.

1962 Expert Committee On Health Laboratory Services. Third Report WHO Planning, Organization and Administration of a Nutrition Health Laboratory. WHO Technical Report Series No. 236, 20 p.

B. General Publications

1973 Guy, K. - Laboratory Organization and Administration 2nd Edition Butterworth & Co. Ltd., London

1971 Department of Health and Science Secutiry (UK)  
Building Note No. 15 - London

1961 Nuffield Foundation Division of Agricultural Studies - The Design of Research Laboratories - Oxford University Press , London

1951 Coleman, H.S. - Laboratory Design. Report by Committee on Design Construction and Equipment of Laboratories - Reinhold, New York

1965 Schramm, W. - Chemistry and Biology Laboratories Design - Construction - Equipment -  
Pergamon, Oxford

FOOD LEGISLATION

A. FAO/WHO Publications

1966 Letham, W.A. - The Principles of Milk Legislation and Control. Food Agricultural Development Papers No. 59, 67 p. - Revised 1966 FAO

1967 FAO Legislation Branch - General Principles of Food Legislation, prepared by the FAO Legislation Branch, FAO, Rome (rev. Ed) - Doc. SP 10/30-GPEL, 63 p. FAO/WHO Joint Food Standards Programme

1967 Food Legislation: Basic Principles, prepared by the FAO Legislation Branch, FAO, Rome - Doc SP 10/30 GPEL PG/67/5, 7 p. FAO/WHO Joint Food Standards Programme

1972 Joint FAO/IAEA/WHO Consultation Group - Report on the Legal Aspects of Food Irradiation, Vienna, 1973, 31 p. STI/DOC/59 International Atomic Energy Agency

1974 Gérard, A. - An Outline of Food Law, prepared for the Legislation Branch, Legal Office, FAO FAO

B. General Publications

1967-1971 Bigwood, E.J., Gerard, A. - Fundamental Principles and Objectives of a Comparative Food Law. 4 Vols. 1st edition S. Karger Basel (Switzerland), New York

1960 Amos, A.J. (editor) Pure Food and Pure Food Legislation Butterworths London

1964 VII Congress Latinoamericano de Química - Código Latinoamericano de Alimentos - 2nd edition Establecimiento Gráfico Sidus SRL, Buenos Aires Rep. Argentina

B. General Publications (cont'd)

1968 O'Keefe, J.A., Bell and O'Keefe's Sale of Food and Drugs (with annual Service Volume) 14th edition

1967 Robinson, F.A. & Amies, F.A. - Chemists and the Law

1968 Fourgout, J.C.D., Jumel, G. - *Traité le lait alimentaire*, Paris, Sté France, 215 p.

1967 Demme, H. - *Lebensmittelrecht Göttingen*, Otto Schwartz & Co.

1971 Berrio, M. & Cormio, B. - (Le frodi alimentari) *La Legislazione alimentare*, 2nd ed. Milano, 1499 p.

C. Periodicals

- Food, Drug and Cosmetic Law Journal
- Food and Agricultural Legislation (FAO)
- International Digest of Health Legislation (WHO)
- Rassegna di Diritto e Tecnica della Alimentazione (Genoa Italy)

MEAT HYGIENE AND INSPECTION

A. FAO/WHO Publications

1955 Joint FAO/WHO Expert Committee on Meat Hygiene: First FAO/WHO Report. FAO Agricultural Studies, No. 30, 52 p. WHO Technical Report Series No. 99

1957 Meat Hygiene (Various authors) WHO Monograph Series No. 33, 527 p. WHO

1959 Joint FAO/WHO Expert Committee on Zoonoses: Second Report. FAO/WHO FAO Agricultural Studies Series No. 47, 20 p. WHO Technical Report Series No. 169

1962 Joint FAO/WHO Expert Committee on Meat Hygiene: Second FAO WHO Report. FAO Agricultural Studies Series No. 58, 30 p. WHO Technical Report Series No. 241

1967 Joint FAO/WHO Expert Committee on Zoonoses: Third Report FAO WHO FAO Agricultural Studies Series No. 74, 50 p. WHO Technical Report Series No. 378

1967 Meat Hygiene. Advances and Problems in the Safe Processing FAO WHO of Meat from Producer to Consumer, including all Public Health Aspects of processes involved in Preparing, Inspecting and Marketing Meat and its Products. FAO Agricultural Studies No. 34, 527 p. WHO Technical Report Series No. 33

Mann, I. Meat Handling in Underdeveloped Countries FAO FAO Agricultural Development Papers No. 70, 200 p.

B. General Publications

1960 American Meat Institute Foundation. The science of meat and meat products - San Francisco, Freeman, 438 p.  
(A series of books on agricultural science: Animal Science 4)

B. General Publications

1955 Ayres, J.C. - Microbiological implications in the handling, slaughtering, and dressing of meat animals

1952 Allenspach, V. - Die Enteritis-Epidemie von Contenswil. Schweiz. Arch. Tierheilk

1959 Dewberry, E. Brocklebank - Food poisoning, food-borne infection and intoxication; nature, history, and causation, measures for prevention and control, 4th edition, London Hill, 411 p.

1956 Drabble, J. - Textbook of meat inspection, 6th rev. edition, Sydney, Angus & Robertson, 414 p.

1958 Dräger, H. - Entstehung und Verhütung von Lebensmittelvergiftungen durch Salmonellabakterien, Jena Fischer, 98 p.

1958 England and Wales, Ministry of Health - Food poisoning; steps to be taken in England and Wales by medical officers of health in the investigations and control of food poisoning. Rev., London, H.M. Stationery Office (Memo, Med., 188), 15 p.

1961 Froehner, H. - Tiertransporte, Hannover, Brücke-Verlag Kurt Schmersov, 256 p.

1951 Gerrard F. - Meat technology: a practical textbook for student and butcher. 2nd edition. London Hill, 314 p.

1951 Great Britain. Ministry of Food Hygiene in catering establishments Report of the Catering Trade Working Party, London, H.M. Stationery Office, 50 p.

1952 Harvey W.C. & Hill, H. - Food hygiene, London, Lewis, 511 p.

1953 Harvey, W.C. & Perry, H.A. - Food hygiene handbook London, Heywood. 159 p.

1953 Hill, H. & Dodsworth, E. - Food Inspection notes; a handbook for students. 4th edition, London, Lewis. 128 p.

B. General Publications (cont'd)

1953 Hobbs, N.C. - Food poisoning and food hygiene.  
London, Arnold, 174 p.

1957 International Association of Veterinay Food Hygienists.  
Proceedings of the first symposium of the International Association  
of Veterinary Food Hygienists, August 27th - September 1st 1956,  
Utrecht, Netherlands, Utrecht, Vermeulen, 238 p.

1961 International Association of Veterinary Food Hygienest.  
Proceedings of the Second Symposium of the International Association  
of Veterinary Food Hygienists, 15-21 May 1960, Basle, Switzerland  
Basle, Boehm, 395 p.

1951 Jacobs, M.B. et al - The chemistry and technology of food and  
food products. 2nd edition. New York, Inter-science Publishers,  
3 vol.

1948 Jean-Blain, M. - Les aliments d'origine animale destinés à l'homme.  
Paris, Vigot, 544 p.

1949 Jensen, L.B. - Meat and meat foods; processing and preservation  
from meat plant to consumer. New York, Ronald Press, 218 p.

1954 Jensen, L.B. - Microbiology of meats. 3rd edition  
Champaign, Ill., Garrard, 422 p.

1957 Lerche, M., Rievel, H. & Goerttler, V. - Lehrbuch der tierärztlichen  
Lebensmittelüberwachung, 3 erweiterte Aufl., Hannover, Schaper,  
1078 p.

1965 Martin, C.R.A. - Practical food inspection, 6th edition,  
London, Lewis, 2 vol.

1958 Miller, A.R. - Meat hygiene, 2nd edition, Philadelphia, Lea &  
Febiger, 557 p.

B. General Publications (cont'd)

1959 Shura, I.V. - Rukovodstvo po veterinarno-sanitarnol expertize produktov uboyezhivotnykh I gigiene myasnogo proizvodstva (Guide to the veterinary health examination of products of animal slaughter and to the hygiene of meat production), Moscow Medgiz.

1968 Thornton, H. - Textbook of meat inspection, 5th edition, London, Baillière, Tindall & Cox.

1957 Trawinski, A. - Higiena I przetworstwo mięsa, Warszawa, Państwowe Wydawnictwo Rolne i Leśne 8e, 554 p.

1960 United States Department of Agriculture, Agricultural Research Service, Meat Inspection Division - Manual of meat inspection procedures of the United States Department of Agriculture, Rev. edition of 1 June 1959, Washington D.C., U.S. Government Printing Office, 229 p.

1962 Faust, E.C., Beaver, P.C. & Jung, R.C. - Animal Agents and Vectors of Human Disease, 2nd edition - Lea and Febiger, Philadelphia

1968 Wilson, A. - Practical Meat Inspection

NUTRITION

A. FAO/WHO Publications

1960 Report of the Technical Meeting on Nutrition in Food Policy and Planning in Asia and the Far East: Bangkok. FAO Nutrition Meetings Report Series No. 28, 50 p. FAO

1962 FAO/WHO Joint Expert Committee on Nutrition. Sixth Report April, 1961 Geneva. FAO Nutrition Meetings Report Series No. 32, 30 p. WHO Technical Report Series No. 245 FAO WHO

1963 Report of the Fourth Inter-African Conference of Food and Nutrition, Sept. 61, Dovaca Cameroon. FAO Nutrition Meetings Report Series No. 33, 54 p. FAO

1966 Report of the Joint FAO/WHO Technical Meeting on Methods of Planning and Evaluation in Applied Nutrition Programmes FAO Nutrition Meetings Report Series No. 39, 73 p. FAO

1967 FAO/WHO Joint Expert Committee on Nutrition, Seventh Report. FAO Nutrition Meetings Report Series No. 42, 40 p. WHO Technical Report Series No. 377 FAO WHO

1971 FAO/WHO Joint Expert Committee on Nutrition. Eighth Report. FAO Nutrition Meetings Report Series No. 49, 104 p. WHO Technical Report Series No. 477 FAO WHO

1972 Regional Nutrition Training Project for Eastern Mediterranean Held in Teheran - FAO/WHO/UNESCO/UNICEF Sub-Regional Seminar FAO

1973 FAO/WHO/UNESCO/UNICEF Second Regional Seminar on Food and Nutrition Sept. 73, Beirut. Report Oct. 1973, 121 p. FAO

1973 FAO Conference, Doc. C73/37 Rome, Nov. 1973 FAO

1974 Near East Commission on Agricultural Planning and Commission on Agricultural Statistics AGS/APC NE/74/8. Feb. 74. Food and Nutrition Policies 7th Session FAO

B. General Publications

1966 Horowitz, A. - The Physician's View to Nutritional Needs in the Western Hemisphere. Proc: of Western Hemisphere Nutrition Congress 1965  
American Medical Association

1970 U.K. Ministry of Agriculture, Fisheries and Food - Manual of Nutrition - HMSO, London

1972 King, Morley and Burgess - Nutrition for Developing Countries  
Oxford University Press

1973 Berg, A. - The Nutrition Factor. Its Role in National Development. - Washington D.C.

1973 Shangunesay, D.E., Shaffer, G.E. - A Systems Approach to Nutrition Planning. War on Hunger - Report for International Development. Washington D.C.

1968 Cameron, A.G. - Food and Its Functions, 2nd edition.  
Edward Arnold, London

PESTICIDES

A. FAO/WHO Publications

1962      Principles Governing Consumer Safety in Relation to Pesticide Residues. Report of a WHO Expert Committee on Pesticide Residues held Jointly with the FAO Panel of Experts on the use of Pesticides in Agriculture: WHO Technical Report Series No. 240, 10 p.      WHO

1964      FAO/WHO Evaluation of the toxicity of pesticide residues in food: report of a Joint Meeting of the FAO Committee on Pesticides in Agriculture and the WHO Expert Committee on Pesticide Residues. FAO Meeting Report, No. PL/1963/13 WHO/Food Add./23 (1964)      FAO  
WHO

1965      FAO/WHO (1965a) Evaluation of the toxicity of pesticide residues in food; report of the Second Joint Meeting of the FAO Committee on Pesticides in Agriculture and the WHO Expert Committee on Pesticide Residues. FAO Meeting Report No. PL/1965/10; WHO/Food Add./26.65      FAO  
WHO

1965      FAO/WHO (1965b) Evaluation of the toxicity of pesticide residues in food. FAO Meeting Report, No. PL/1965/10/1; WHO/Food Add./27.65      FAO  
WHO

1965      FAO/WHO (1965c) Evaluations of the hazards to consumers resulting from the use of fumigants in the protection of food. FAO Meeting Report, No. PL/1965/10/2; WHO/Food Add./28.65      FAO  
WHO

1967      FAO/WHO (1967a) Pesticide residues in food; joint report of the FAO Working Party on Pesticide Residues and the WHO Expert Committee on Pesticide Residues. FAO Agricultural Studies No. 73; WHO Technical Report Series No. 370      FAO  
WHO

1967      FAO/WHO (1967b) Evaluation of some pesticide residues in food. FAO Meeting Report, No. PL/CP/15; WHO/Food Add./67.32      FAO  
WHO

A. FAO/WHO Publications (cont'd)

1967 Safe Use of Pesticides in Public Health. Sixteenth Report of WHO Expert Committee on Insecticides. WHO Technical Report Series No. 356, 40 p. WHO

1967 WHO (1967) Procedures for investigating intentional and unintentional food additives; report of a WHO Scientific Group. WHO Technical Report Series No. 348, 25 p. WHO

1968 FAO/WHO (1968a) Pesticide residues; report of the 1967 Joint Meeting of the FAO Working Party and the WHO Expert Committee. FAO Meeting Report, No. PL/1967/M/11; WHO Technical Report Series No. 391, 30 p. FAO WHO

1968 FAO/WHO (1968b) Evaluation of some pesticide residues in Food. FAO/PL:1967/M/11/1; WHO/Food Add./68.30 FAO WHO

1969 FAO/WHO (1969a) Pesticide residues in Food; report of the 1968 Joint Meeting of the FAO Working Party of Experts on Pesticide Residues and the WHO Expert Committee on Pesticide Residues. FAO Agricultural Studies, No. 78, 30 p. WHO Tech. Report Series, No. 417 FAO WHO

1969 FAO/WHO (1969b) 1969 evaluations of some pesticide residues in food. FAO/PL:1968/M/9/1; WHO/Food Add./69.35 FAO WHO

1969 Monro, H.A.U. - Manual of Fumigation for Insect Control FAO Agricultural Studies No. 79, 2nd edition, 38 p. FAO

1970 FAO/WHO (1970a) Pesticide residues in food; reports of the 1969 Joint Meeting of the FAO Working Party of Experts on Pesticide Residues and the WHO Expert Group on Pesticide Residues. FAO Agricultural Studies No. 84, 43 p. WHO Technical Report Series No. 458 FAO WHO

1970 FAO/WHO (1970b) 1969 evaluations of some pesticide residues in food: FAO/PL:1969/M/17/1; WHO/Food Add./70.38 FAO WHO

A. FAO/WHO Publications (cont'd)

1971 FAO/WHO (1971a) Pesticide residues in food; report of the 1970 Joint Meeting of the FAO Working Party of Experts on Pesticide Residues and the WHO Expert Group on Pesticide Residues, FAO Agricultural Studies No. 87, 44 p. WHO Tech. Report Series No. 474 FAO WHO

1971 FAO/WHO (1971b) evaluation of some pesticide residues in food. FAO/AGP/1970/M/12/1; WHO/Food Add./71.42 FAO WHO

1972 FAO/WHO (1972a) Pesticide residues in food; report of the FAO Working Party of Experts on Pesticide Residues and the WHO Expert Committee on Pesticide Residues, FAO Agricultural Studies No. 88, 46 p. WHO Technical Report Series No. 502 FAO WHO

1972 FAO/WHO (1972b) evaluations of some pesticide residues in food. FAO/AGP/1971/M/9/1; WHO Pesticide Residues Series No. 1 FAO WHO

1972 FAO/WHO (1972c) Report of the Sixth Session of the Codex Committee on Pesticide Residues. Alinorm 73/24 FAO WHO

1972 FAO/WHO (1972d) Evaluation of certain food additives and and the contaminants mercury, lead, and cadmium. Sixteenth report of the Joint FAO/WHO Expert Committee on Food Additives. FAO Nutrition Meetings Report Series, No. 51, 32 p.; WHO Technical Report Series, No. 505 FAO WHO

1973 FAO/WHO (1973b) 1972 evaluation of some pesticide residues in food. FAO/AGP/1972/M/9/1; WHO Pesticides Series No. 2 FAO WHO

1973 FAO/WHO (1973) Pesticide Residues in food. Report of the 1972 Joint Meeting of the FAO Working Party of Experts on Pesticide Residues and the WHO Expert Committee on Pesticide Residues. FAO Agricultural Studies No. 90; WHO Technical Report Series No. 525 FAO WHO

A. FAO/WHO Publications (cont'd)

1969

Control of Pesticides. A Survey of Existing Legislation  
Reprint from the International Digest of Health Legislation  
Vol 20, No. 4

WHO

1969

FAO/WHO Guidelines for Legislation concerning the  
Registration for Sale and Marketing of Pesticides PL:CP/21  
OM/69 3

FAO

WHO

SEA FOODS - HYGIENE AND QUALITY CONTROL

A. FAO/WHO Publications

1969 Report of FAO Conference on Fish Inspection and Quality Control - Canada July 1969. FAO Fisheries Reports 08981-69; 81/E; 81/F; 81/S, 73 p. FAO

1969 Code of Practice for Fresh Fish. FAO Fisheries Reports 08497-69 74/E; 74/F; 74/P. 32 p. FAO

1970 FAO Technical Conference of Fish Inspection and Quality Control. Working Papers. FAO Fisheries Reports Vol I 22972-70; 81/1T; Vol II 22973 81/2T. 491 p. FAO

1970 Report of the 3rd Ad Hoc Consultation on Codes of Practice for Fish and Fish Prospects: Rome, 1970; 11271-70 No 89/E; 89/F; 89/S - 5 p. FAO

1971 A Model Fishery Products Quality Control Laboratory. FAO Fisheries Technical Papers 21664-71 No 107/E ; 22 p. FAO

1971 Kreuzer, R. (Editor) FAO Fish Inspection and Quality Control. Papers of FAO Technical Fishing News (Books) Ltd. Conference of Fish Inspection and Quality Control - Halifax West By Fleet Surrey, UK

1972 Code of Practice for Frozen Fish. FAO Fisheries Circulars 19589-72 No. No 149/E; 39 p. FAO

1972 Administrative Aspects of Fish Inspection and Quality Control: FAO Fisheries Reports 18672-72 Nos 114/T; 115/T; 116/T.; 48 p. FAO

1972 Fish Inspection Programmes. FAO Fisheries Reports 17575-72 No 114/T; 79 p. FAO

1972 Technical Aspects of Fish Quality Control. FAO Fisheries Reports 17149-72 No 115/T; 102 p. FAO

A. FAO/WHO Publications (cont'd)

1973 Code of Practice for Canned Fishery Products. FAO  
Fisheries Circulars 23760-73 No 315/E; 315/F; 315/S.; 42 p.

FAO

1973 Report of the Ad Hoc Consultations on Codes of Practice  
for Fish and Fishery Products (Shrimp and Smoked Fish)-  
Rome, Sept 73. FAO Fisheries Reports No 140/E 5 p.

FAO

B. General Publications

Borstrom, G. (ed) - Fish as food

1961 Vol.1: Production, biochemistry and microbiology, 725 p.

1962 Vol.2: Nutrition, sanitation and utilization, 777 p.

1965 Vol.3: Processing - part 1, 489 p.

1965 Vol.4: Processing - part 2, 518 p.

New York and London, Academic Press, (references).

1968? Chupakhin V. & Dormanko, V. - Fish-processing equipment.  
Moscow, MIR Publishers, 531 p. (translated from Russian)

1968 Dictionnaire multilingue des poissons et produits de la pêche.  
Paris, Organisation de Coopération et de Développement Economiques,  
2 Rue André Pascal, et London, Fishing News (Books) Ltd., 110  
Fleet Street, E.C.4.; 431 p.

1970 Embalage et matériaux d'emballage pour le conditionnement du  
poisson. Paris, Organisation de Coopération et de Développement  
Economiques, 2 Rue André Pascal, 99 p.

1962 Heen, E. & Kreuzer, R. (ed). - Fish in nutrition. London, Fishing  
News (Books) Ltd., 110 Fleet Street, E.C.4.; 447 p. (references).

1965 Kreuzer, R. (ed). - The technology of fish utilization. London  
Fishing News (Books) Ltd., 110 Fleet Street, E.C.4., 280 p.  
(references).

B. General Publications (cont'd)

1964 Ludorff, W. - *El pescado y sus productos.* Zaragoza, Editorial ACRIBIA, España, 300 p.

1968 Multilingual dictionary of fish and fish products. Paris, Organisation for Economic Co-operation and Development, 2 Rue André Pascal and London, Fishing News (Books) Ltd., 110 Fleet Street, E.C.4, 431 p.

1970 Packages and packaging material for fish. Paris, Organisation for Economic Co-operation and Development, 2 Rue André Pascal, 95 p.

1953 Penso, G. - *Les produits de la pêche. Valeur alimentaire, inspection sanitaire, réfrigération et congélation, conserves et sous-produits, outillage industriel.* Paris, Vigot Frères, 23 rue de l'Ecole-de-Médecine, 418 p. (bibliographie).

1965 Tanikawa, E. - *Marine products in Japan.* Hokkaido, Faculty of Fisheries, Hokkaido University, Hakodate, Japan, 611 p.

1967 Handbook of compliance; Canned fish and shellfish inspection regulations; Canneries, Ottawa, Inspection Service, Department of Fisheries of Canada, Canada, 1967, 58 p.

1968 Handbook of compliance; Fish inspection regulations; Fresh and frozen fish processing establishments. Ottawa, Department of Fisheries of Canada, 48 p.

1966 Kramer, A. & Twigg, B.A. - *Fundamentals of quality control for the food industry.* Westport, the AVI Publishing Co. Inc., Connecticut, U.S.A., 541 p. (references).

1971 Kreuzer, R. (ed) - *Fish inspection and quality control.* London, Fishing News (Books) Ltd., 110 Fleet Street, E.C.4., 290 p. (references).

1970 Heiss, R. (Editor) - *Principles of Food Packaging: An International Guide.* - P. Kepler Verlag K.G., 6056 Heusenstamm Industrie Strassel, Federal Republic of Germany

B. General Publications (cont'd)

1959 Love, R.M., Lovorn, J.A. & Jones, N.R. - The Chemical composition of fish tissues (Fish Investigation Board special report No. 69)

1969 Orr, A.P. & Marshall, S.M. - The fertile sea

1968 Ricker, W.E. - Fish production in fresh waters (IBP Handbook No. 3)

1951 Tressler, D.K. & Lemon, J. McW. - Marine products of commerce: their acquisition, handling, biological aspects and the Science and technology of their preparation and preservation; 2nd edition.

1950 Williams, R.T. - The biochemistry of fish (Biochemical Society Symposium No. 6)

1966 UNESCO, FAO & OAU, Oceanography and Fisheries, Resources of the Tropical Atlantic (Symposium)

C. Periodicals

- Dairy Science Abstracts
- FAO Fisheries Reports
- Journal of Dairy Science
- Journal of Animal Science
- Journal of the Fisheries Research Board of Canada
- Journal of Dairy Research
- Journal of the Society of Dairy Technology
- Netherlands Milk and Dairy Journal
- Veterinary Annual

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